A. F. Cowling
27.viii.47

ONTARIO

REPORT

of the

ONTARIO ROYAL COMMISSION ON FORESTRY

1947

PRICE ONE DOLLAR

TORONTO
Printed and Published by Baptist Johnston, Printer to the King's Most Excellent Majesty
1947

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MAPS

In Envelope at Back of Book

GLOSSARY OF TERMS

In Envelope at Back of Book

PROVINCE OF ONTARIO

GEORGE THE SIXTH by the Grace of God of Great Britain, Ireland and the British Dominions beyond the Seas KING, Defender of the Faith, Emperor of India.

TO

MAJOR GENERAL HOWARD KENNEDY, C.B.E., M.C., B.Sc. (McGill)

GREETING:

WHEREAS in and by Chapter 19 of The Revised Statutes of Ontario, 1937, entitled "The Public Inquiries Act", it is enacted that whenever Our Lieutenant-Governor in Council deems it expedient to cause inquiry to be made concerning any matter connected with or affecting the good government of Ontario, or the conduct of any part of the public business thereof, or of the administration of justice therein, and such inquiry is not regulated by any special law, he may, by Commission appoint a person or persons to conduct such inquiry, and may confer the power of summoning any person and requiring him to give evidence on oath, and to produce such documents and things as the Commissioner or Commissioners deem requisite for the full investigation of the matters into which they are appointed to examine;

AND WHEREAS Our Lieutenant-Governor in Council of Our Province of Ontario deems it expedient to cause inquiry to be made concerning the matters hereinafter mentioned;

NOW KNOW YE that WE, having and reposing full trust and confidence in you the said HOWARD KENNEDY, DO HEREBY APPOINT you to be our Commissioner to investigate, inquire into and report upon the forest resources of Ontario and their conservation, management, development and beneficial utilization for all purposes, including but without limiting the generality of this reference the following subjects:

(a) the extent, nature and value of the forest resources;

(b) the methods employed in forest operations heretofore carried on and the forest conditions resulting therefrom;

(c) the improvement of methods of planting, developing, cutting, manufacturing and otherwise utilizing forest trees, the marketing of forest trees and the products thereof, and the development of new products;

(d) the closer integration of the various types of forest operations and of the industries utilizing forest products;

(e) the relation of forestry and forest industries to other basic industries, particularly farming;

(f) the relation of forestry to soil conservation;

(g) the status of woodsmen with particular regard to wages, working and living conditions and the development of forest colonies;

(h) the education and training of forest engineers, forest rangers, scalers and inspection personnel generally;

(i) the education of the public as to the importance of the forests and woodlots in the social and economic life of the Province;

(j) reforestation and research;

(k) the maintenance of an adequate forest-cover with a view to the regulation of moisture run-off and the maintenance of levels of lakes and streams;

(l) waterways and waterpower with relation to forest operations and the manufacture of forest products;

(m) the statutes, orders and regulations under which forest lands are now administered and licensed or made available to private enterprise;

(n) the supervision and administration of forest lands, forest operations and industries utilizing forest products by the Department of Lands and Forests;

(o) all other aspects of forestry; and

(p) all relevant facts relating to any matter into which, in the opinion of you Our said Commissioner, it is necessary to inquire, in order to carry out, fully and effectually the duties imposed upon you, hereunder.

AND WE DO HEREBY CONFER on you Our said Commissioner the power to summon any person or corporation and require him to give evidence on oath and to produce such documents and things as you Our said Commissioner deem requisite for the full investigation of the matters into which you are appointed to examine, by subpoena signed by you.

TO HAVE, HOLD AND ENJOY the said Office and authority of Commissioner for and during the pleasure of Our Lieutenant-Governor in Council for Our Province of Ontario.

IN TESTIMONY WHEREOF We have caused these OUR LETTERS to be made PATENT and the GREAT SEAL OF OUR PROVINCE OF ONTARIO to be hereunto affixed.

WITNESS:

THE HONOURABLE ALBERT MATTHEWS,
LIEUTENANT-GOVERNOR OF OUR PROVINCE OF ONTARIO

at Our CITY OF TORONTO in Our said Province this sixteenth day of April in the year of Our Lord one thousand nine hundred and forty-six and in the tenth year of Our Reign.

BY COMMAND

(Signed) F. V. Johns,
Assistant Provincial Secretary.

To His Honour the Lieutenant-Governor of Ontario.

Sir:

Pursuant to powers contained in "The Public Inquiries Act", Chapter 19, of the Revised Statutes of Ontario, 1937, and in accordance with Letters Patent issued on the 16th day of April, 1946, I was appointed the sole Commissioner to inquire into and report upon certain matters therein set out.

The inquiry has been completed and I respectfully submit this report.

I have the honour to be, Sir, your obedient servant.

HOWARD KENNEDY,
Commissioner.

May 12, 1947.

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PREFACE

In order to prepare this report, sufficient material for several volumes has been accumulated, but it was considered that a voluminous document might defeat its own purpose. Serious thought and effort have therefore at all times been directed towards confining the report to the smallest dimensions consistent with an adequate presentation of the essential information. On account of the importance and complexity of the subject matter, it is felt that no further condensation can properly be made. No official summary has therefore been printed.

Statistics concerning forests and forest industries have been found inconsistent and, in many instances, incomplete but despite this I believe they are sufficiently reliable to indicate the facts fairly, if not accurately.

I have endeavoured to reach sound conclusions and make intelligent recommendations from the data at hand. Where possible, pictorial and graphical, rather than tabular methods of presentation have been used. The pictures reproduced were chosen from among several hundred and, with the exception of two provided by the Reforestation Division of the Ontario Department of Lands and Forests, were all taken by members of the Commission staff. They represent typical rather than extreme conditions of the subject portrayed and should be considered an integral part of the report.

Not only for myself but also on behalf of every member of the Commission staff, it is a pleasure to record my thanks to the many individuals, corporations and both Provincial and Federal Government departments for their willing and cheerful co-operation. which has been of the utmost value in the preparation of this report and without which the task would have been unpleasant and more difficult. To mention all by name would not be feasible; to mention some would not be enough.

CHAPTER I

Introduction

A rational approach to the understanding and solution of any complex problem requires some knowledge of the influences which have had a major share in its development. In this connection, I submit the following narrative concerning the forests of this Province. It is condensed mainly from material appearing in the Annual Report for 1899 of the Clerk of Forestry for the Province, which was reprinted in the Report for 1907 of the Department of Lands, Forests and Mines. The late Mr. Aubrey White, then Deputy-Minister of the Department, assisted in its preparation and a reading of the report in its entirety will amply repay those interested in the early developments in forestry and the forest industries in Canada. It must be kept in mind that prior to Confederation, the forests of both Upper and Lower Canada were under the control of the Central Government. My comments are printed in italics.

French Regime

Under the seignorial system the French Crown granted large tracts of land to individuals who in turn allotted it to tenants under varying conditions, on many occasions including conditions not pertinent to the original grant. The use of the land for agriculture was the dominating feature and the conditions relating to timber were almost negligible. As early as 1683, all oak suitable for the use of the Navy was reserved for that purpose. This regulation was the cause of later difficulty when it prevented the clearing of land. There were many recorded instances where the cutting of such timber by colonists gave grounds for complaint. *This indicates that the conflict between the colonist and the timber holder is not of any recent origin. Only one seigneurie, the Seigneurie de l'Orignal, was located in what is now Ontario.*

British Regime

In 1763 Governor James Murray arranged for the survey of Townships and the setting aside therein of adequate reserves of timber for fortifications and barracks for the Army and Navy and for naval timber, mentioning specifically that the area between Lake Champlain and the St. Lawrence River be set aside as a reserve for "masting for the Royal Navy and other useful and necessary timber for naval constructions." In 1775 Sir Guy Carleton was instructed, "It is our will and pleasure, however, that no grant be made of any lands on which there is any considerable growth of white pines fit for masting for our Royal Navy, and which lie convenient for water carriage, but that you do cause all such lands to be set apart for our use, and proper regulations made, and penalties inflicted to prevent trespass on such tracts, and the cutting down and destroying of the trees growing thereon."

It is therefore apparent that the system of setting aside Crown lands in the Provinces of Ontario and Quebec had its genesis in the needs of naval construction, first for the Navy of France and later for the Royal Navy of Britain.

Early Licenses to Cut Timber

Licenses to cut timber in Canadian forests were granted, by the British Government, to contractors for the Naval Dockyards and there is ample evidence to indicate that they took advantage of the privilege extended to them and carried on a general business of supplying timber to the British market under the guise of operations for the Naval Dockyards.

Protective Tariff

The principals in such contracts appointed local agents in Canada who reaped rich rewards from the trade. The trade was given a tremendous impetus in the early days of the nineteenth century, when the Mother Country turned to Canada for timber after Napoleon shut off her supplies from the Baltic. Later a heavy duty was imposed on foreign timbers as a revenue measure to help pay for the Napoleonic Wars. These duties were afterwards retained with the avowed purpose of protecting and fostering the colonial trade. The statistics of that period indicate that the duty was most effective in curtailing the flow of timber from Europe, particularly from the Baltic States, thereby building up the Canadian export business to a corresponding degree.

Protection of this nature was reduced during the intervening years until in 1846, during the regime of Rt. Hon. W. E. Gladstone as Colonial Secretary, it was reduced to a point where it was presumed to meet only the differential in freight rates between the Baltic States and Canada. This protection was later to disappear, but the Canadian timber trade was by then established so solidly that the export trade to Britain was able not only to meet foreign competition, particularly that of the Baltic States, but even to expand in the face of such competition.

Timber Regulations

There seem to have been no Canadian laws governing the timber trade prior to 1805 when Lower Canada enacted certain regulations, mainly concerning the measurement and floating of timber in the St. Lawrence River. The earliest enactments in Upper Canada appear in 1819 and, strangely enough, refer to the placing of a duty on timber imported from the United States. This practice was extremely popular at that time, as by such methods United States exporters obtained the advantage of the existing colonial preference in the British market. The matter of holding timber suitable for the British Navy was still very much the governing factor, and instructions to the Duke of Richmond, Governor-in-Chief at that time, were very specific as to the setting aside of such reserves.

Forests for Provincial Revenue

It will be observed that up to and including the first quarter of the nineteenth century, the forests of both Upper and Lower Canada were looked upon as a source of supply of timber for the Royal Navy and, incidentally, as a source of profit for the individual privileged to take part in the trade. The country derived no direct revenue in the way of stumpage or rentals, and local enterprise was stifled unless it was under the auspices of an accredited agent of the contractors for the Royal Dockyards. Naturally enough, such conditions created a "black market" in which illicit lumbering operations flourished and this eventually resulted in the abolition of the dockyard contractors' monopoly.

Public Lands Act

In 1826 Sir Peregrine Maitland, Lieutenant-Governor of Upper Canada, directed that British subjects resident in Upper Canada might cut timber in the unsurveyed portions of the Ottawa River watershed.

Introduction of Stumpage Dues and Permits to Cut by Others than Naval Contractors

A series of dues based on the number of logs cut was established. In order to discourage the cutting of immature timber, double dues were imposed on logs which would not square more than eight inches.

In 1827, the Commissioners of His Majesty's Treasury appointed Peter Robinson as Surveyor General of Woods and Forests in the Province of Upper Canada and provided that, in May of each year, he should report what districts contained timber which was not "fit and proper" for His Majesty's Navy and, therefore, might properly be felled by His Majesty's subjects. Auction sales of such lots of timber were provided for and stumpage rates set. Each license was for a quantity not exceeding 2,000 cubic feet. Unfortunately the Surveyor General did not follow his rather explicit instructions and many irregularities were permitted and condoned, with considerable financial loss to the young Province.

Distribution of Crown Lands to Private and other Interests

In defiance of both the letter and spirit of the instructions repeatedly issued by the home Government, the Provincial Government of the day deviated far from the principles of both sound national economy and good business administration. Public lands were widely distributed to favorites and others, causing great harm to the young settlements in that normal development for agricultural purposes of the townships involved was seriously hampered. The dissatisfaction so engendered was to a large extent responsible for the Rebellion of 1837. Lord Durham's exhaustive investigation and report on the existing abuses focused attention on the exceedingly profligate manner in which forest land was dispensed to friends and legislators. Some legislative councillors received grants of 5,000 acres with an additional 1,200 acres for each child, the only cost being the fees paid to officials who drew up the deeds.

The setting aside in Upper Canada of one seventh of the land for Clergy Reserves further aggravated the situation. In one special instance a private company received entire control of 1,100,000 acres of choice timberland in the western portion of the young Province.

The result of the alienation of such large areas of public domain to private ownership was inevitable. Speculators could buy timber, from owners who had acquired these areas, for much less than the stumpage dues charged for an equivalent amount of timber cut on Crown lands. *Schemes for obtaining stumpage-free timber have persisted under the guise of settlement almost to the present day.*

Widespread forest fires, due mainly to land clearing operations of settlers, seem to have persisted throughout this period, with little organized effort to meet the situation. The clearing of land for agriculture apparently was considered much more important than any effort at forest conservation.

Crown Timber Act; Timber Licenses Introduced

A depression in 1847-48, due largely to over-production in the immediately preceding years as a result of a brisk demand and high prices for timber in the British market, resulted in a Select Committee on the Lumber Trade being appointed by the Canadian Legislature in 1849. This Committee drew up the first Crown Timber Act which was passed the same year under the title, "An Act for the Sale and Betterment of Timber Upon the Public Lands".

This Act provided that the Commissioner of Crown lands might grant licenses at such rates and subject to such conditions, regulations and instructions as might be established from time to time by the Governor of the Province, upon the advice of the Executive Council. These licenses were for 12 months only and provided for proper returns of timber cut.

The accompanying regulations specified the sizes of limits, and the Crown dues (stumpage) to be paid, and provided for the renewal of the licenses in question where the holder had complied with the regulations. They also guarded against speculators holding berths by stipulating that, in all seasons not specifically excepted, the operator must cut at least 500 cubic feet of timber or 20 saw logs per square mile of limit on larger holdings, with somewhat higher production on berths of four square miles or smaller.

Ground Rent Introduced

Subsequent regulations, promulgated in 1851, indicate that considerable timber stealing was going on, as stiff penalties were provided for squatters and others taking violent possession of disputed lands and for interfering with surveying, etc. Annual ground rent of two shillings and sixpence per square mile of limit was introduced and provision made to assure the payment of dues for timber slidage and Crown dues generally.

Export Levy on Unprocessed Wood

Logs exported from the Province (presumably to the United States) were assessed at double rates of Crown dues on domestic production.

Separation of Forest Lands from Agricultural Lands Recommended

That forest fires were a matter of grave concern a century ago is evidenced by the introduction of a Bill, during the Session 1854-55, for the protection of the forests and preventing the setting of fires to the woods for the purpose of clearing lands. This Bill was dropped, due to the setting up of a Select Committee with its terms of reference "To examine and report upon the present system of management of the Public Lands and the various dues arising therefrom, together with the present mode of selling, leasing and otherwise disposing of the same, to report thereon with all convenient speed, with power to send for persons, papers and records." Conflicting testimony before this Committee emphasized the clash of interests between the operators producing square timber and the sawmill operators, and between those interested in the sale of land and those interested in perpetuating the forest. For the first time the folly of allotting typically forest land to settlers, allegedly for agriculture, was thrown up in relief. The separation of forest lands from agricultural lands, by means of forest surveys, and the prevention of timber-mining by pseudo-settlers, were even then advocated but have never been adequately controlled. *Much has*

been accomplished since 1921 in the control of the practice of allotting timber lands for farming, but further remedial measures are required, mainly the completion of the survey advocated 90 years ago, as a result of which typically forest lands will be set aside in perpetuity for the growing of forests.

Hardwoods

The attitude towards hardwoods on the part of pine operators at that time was forcibly expressed before the above Committee by one witness, James Henry Burke of Bytown, as follows:

> "But mark this co-incidence! Surrounding this pine territory and contiguous to the great lumber fields is the large area to which we have alluded, possessing a fertile soil and timbered with hardwood. This timber has not the value of pine, and its destruction is not a national loss."

If any considerable proportion of these hardwood stands remained to-day, they would form the backbone of huge furniture, flooring and handle industries which now have to import raw materials from the United States or from Eastern Quebec and the Maritimes.

The Select Committee apparently did not get to the point of making recommendations, but referred the evidence to the Legislature and suggested another Select Committee of the House at the next meeting of Parliament.

Subsequent Orders-in-Council seem to have been aimed, mainly, at emphasizing the fact that the payment of ground rent did not create a vested right which would preclude the imposition of new conditions or of increased payments for rentals or Crown dues.

Squatters and Timber Stealers

Great embarrassment was caused by the squatters and timber-miners in the late 50's and early 60's. Unwise regulations helped to destroy much good timber in that, although a settler might cut down and burn timber for land clearance, he could be treated as a trespasser if he sold it. Timber stealing was widely practiced and dealers were known to allot contracts up to 100,000 cubic feet of hewn timber to individuals who did not possess any timber-holdings from which it could be produced.

A Select Committee was appointed in 1863 to enquire into the rapid destruction of the forests, but the time at their disposal was too short to go thoroughly into the subject. Another Committee, appointed the following year to complete the work, never made any report. Representatives of the industries involved were prominent on the Committees.

Confederation

With Confederation in 1867, among the subjects coming exclusively within the scope of Provincial Legislators was "the management and sale of public lands belonging to the Province and of the timber and wood thereon."

Although there is evidence that much thought was given to, and a diligent search made for, a remedy for the problems besetting land settlement and forestry in the Province, the matter seems to have been side-tracked for various reasons.

Hemlock Bark Export

A symptom of the destructive forest exploitation of those days is portrayed in an enquiry, set afoot in 1868, during which a Select Committee of the House of Commons studied the shipment of hemlock bark to the United States for tanning purposes. It indicated that some 100,000 cords of bark were exported annually from Canada and that in providing this, 10,000 acres of forest were denuded and the timber left to rot on the ground, constituting a fire hazard when the bark has been removed. The Committee in its report recommended an export tax of $1.00 per cord on hemlock bark to curb the drain on the forests, pointing out that each area involved would be cut out in 10 to 12 years, leaving the community without a continuity of income from tanbark production. Petitions to the Government by exporters and interested parties killed the efforts of the Committee and with them the hemlock forests of Ontario and Quebec, as the Government decided to take no action. The interested operators at the time brought out the arguments of the exporters: employment provided, wages distributed, impetus to other industries, etc.

Export of Sawlogs

Another Select Committee of the Provincial Legislature of 1868 dealt with the export of sawlogs, shingle-bolts and stave-bolts, but it does not appear that they ever rendered a report. The interests involved in export appear to have been extremely well served in the Legislatures in this country as well as in the United States.

A Select Committee of the Dominion Parliament in 1874 painted the export duty on sawlogs as a protection for Michigan timber operators, a detriment to Canadian settlers and as only of slight benefit to the Canadian sawmilling industry, with the result that the export duty on stave-bolts and oak logs was removed in 1875.

The export duties on shingle-bolts, spruce logs and pine logs were altered at various times in the 80's and after a bit of what might be termed "horse trading" between the sawmill operators and the log exporters, the Government announced in 1891 that the export tax on logs to the United States was removed. The same year the duty of $1 per M. on Canadian lumber was also abolished, and free trade in lumber and logs between Canada and the United States came into existence. This happy condition had existed only a couple of years, when a business depression set in in the United States and a duty of $2.00 per M. was again imposed on rough lumber from Canada. This acted as a protection for the Michigan operators, who increased their imports of logs from the Lake Huron Forests of Ontario to be sawn in the United States instead of the lumber formerly imported from Canada.

The pleas of the Ontario lumbermen, particularly those from Western Ontario who were hardest hit, were finally heeded and in 1898 the Provincial Government passed regulations providing that all logs cut on Crown lands should be manufactured in the Province. United States operators immediately claimed breach of contract on the part of the Government and that, in any event, the regulations were ultra vires of the Provincial Government. The case was heard in 1899 with judgment in favour of the Province.

Northwestern Ontario

Lumbering in Ontario was at first mainly centred in the Ottawa Valley and on streams flowing to Lake Ontario and Lake Erie, but the rapid development of the sawmilling industry necessitated a westerly expansion, and in 1871 the Muskoka-Parry Sound area was opened up for the sale of timber licenses. The following year the industry spread along the north shore of Lake Huron and flourished for some decades, though there are few units now left of that tremendous development.

The areas then leased supported thriving communities until a bit after the turn of the century, but the reckless exploitation carried on inevitably destroyed the industry. In general, the history of lumbering, not only in Canada but also in the United States, has been that few areas once opened up have lasted more than 25 to 30 years, when the vast majority of timber-miners have had to seek new horizons, usually leaving desolation in their wake. It is true that a few concerns have been more far-sighted and reasonable in their treatment of the forest and have remained in business in the same locality for generations. Unfortunately, the number of such operators is only too small and their experience has been the exception rather than the rule.

Diameter-limit Introduced

The first appearance of a diameter-limit in cutting regulations occurred in 1871 when, by Order-in-Council, a minimum diameter of 13 inches on the stump was decreed. The only species being cut in quantity in those days were the white and red pines, white spruce, oak and hemlock (for bark).

Floating of Logs and Timber Marking

Owing to the floating of logs by various operators in the same streams, "An Act respecting the Marking of Timber" was passed in 1870. Regulations were made to prevent the duplication of marks and severe penalties provided for misappropriation of timber so protected.

For a considerable period, rival operators disagreed widely regarding the use of streams, as the operator who had originally improved the river by the removal of rocks from rapids, the construction of booms, piers, slides, etc., claimed prior and sometimes exclusive rights. Since previous legislation had not clarified the situation, "The Streams Bill", passed in 1881, provided that all operators might use such improvements and have passage along the banks of any drivable stream, upon the payment of proper tolls. The schedule of these tolls was to be approved by the Lieutenant-Governor-in-Council.

A test case concerning these rights (McLaren and Caldwell) was fought in 1881 and, though the Dominion Government disallowed "The Streams Bill" each time it was presented by the Ontario Government in 1881, 1882 and 1883, an appeal to the Privy Council by Caldwell was settled in his favor in 1883 and the Bill, when again presented to the Dominion Government in 1884, was allowed to stand until replaced by a more comprehensive Act in 1887. Since then there has been little alteration in the legislation covering the joint driving of streams.

Ontario Cullers Act

An Act for the licensing of cullers, adopted in 1890, provided for more adequate returns and standardized methods of measurement.

Forest Fires

The forests of Ontario seem to have been plagued by fires from the earliest days of settlement and reports to the various Governments concerning the matter appear as early as 1849 and at intervals from then on. In the report of Mr. P. M. Partridge, Superintendent of Woods and Forests, under date of 1859, the question of forest fires was forcefully drawn to the attention of the Government of the day, particularly in view of the very extensive prospecting operations for gold which appeared imminent.

Nothing much seems to have resulted from the complaints made at that time and all efforts were then directed rather toward suppression than prevention.

In 1878, "An Act to Preserve the Forest from Destruction by Fire" was passed which contained many of the clauses necessary for preventing the setting of fires, but it proved to be difficult to enforce due to a lack of organization.

It was only in 1885 that a fire-prevention organization, consisting at first of only 39 rangers, was inaugurated but from this modest beginning it has expanded tremendously in size and efficiency with the years.

Beginning of Pulp and Paper Industry

Exploitation of the forests of Ontario was confined to lumbering and the production of tanbark, ties, poles, etc., until after the turn of the century when the utilization of wood for the manufacture of pulp began to assume considerable proportions. The opening of the Temiskaming and Northern Ontario Railway in 1903 and the construction and operation of the Grand Trunk Pacific through the northern Clay Belt shortly afterwards, gave a great impetus to the production of pulpwood and to the construction of mills in Northern Ontario.

Agricultural Land for Settlers

Since the days of the earliest settlements in Ontario, records indicate that, though the lumbering or pulp and paper industry invariably forged ahead of settlement, the cutting operations were always closely followed by some genuine settlers who intended to stay on the lands. Unfortunately, in addition to this stable group, there was always a host of pseudo-settlers or timber-miners who apparently had little or no intention of remaining to cultivate the soil. They quickly stripped the farms allotted to them and passed on to new allotments, generally leaving waste and desolation in their wake. Until comparatively recent years little effort was made to confine their activities to land which could possibly be maintained in agriculture after its forest cover was gone. One has but to look at the annual sales and free grants of land to such so-called settlers, with the accompanying cancellations of lands previously allotted, to see the widespread ramifications of this development which might well be described as a "racket". (See diagram, page 146.)

A Select Committee in 1863 reported and recommended:
"It appears from the evidence that settlement has been unreasonably pushed in some localities quite unfit to become the permanent residence of an agricultural population. Especially has this been the case on some of the Free Grant roads and adjacent country, lying between the waters of the Ottawa and Lake Ontario. Your Committee would refer to the evidence and recommend that the Government should, in all cases, ascertain positively the character of the country before throwing open

any tract of land for settlement, so that such lands that are really not fit for profitable cultivation may not be thrown upon the market. There being considerable diversity of opinion among the witnesses in regard to some of the localities adverted to, it seems to the Committee that the Government should have an examination made by some thoroughly competent and reliable officer, whose report would be available in any further consideration of this subject."

This question which was reported on over 80 years ago has never resulted in the over-all survey recommended though, with the passage of years and the increase of the drain on the timber resources of the Province, it was and still remains one of the crying needs of forestry.

General

It is timely to note that the history of forest operations in this Province, with few exceptions, has been that of "cut out and get out."

The white pine stands of the Ottawa Valley now support only a handful of operators, whereas in the hey-day of that area over a billion feet of white pine was produced per year. It will take upward of a half century to restore the pine industry of that area, and then only if vigorous and comprehensive restorative measures are taken.

The white pine and red pine forests of the Georgian Bay district are no more and it is doubtful if they are likely to be, or indeed can be, restored in any measure approaching the density or quality of the original stands. They, along with the equally valuable stands of the north shore of Lake Huron, disappeared in about three decades with a very considerable portion of the raw product exported to the United States in the form of unprocessed logs.

The Trent Valley watershed and adjacent areas, once one of the finest white pine areas in the world, now present hundreds of thousands of acres of wasteland as mute testimony to man's extravagant methods of exploitation.

There were large areas of white and red pine west of the Great Lakes, but these too have disappeared. A few small areas remain only because of their inaccessibility under the methods practiced when the stands surrounding them were removed.

The preference of pulp mills for spruce will similarly remove that species as a major component of our forests unless remedial measures are taken. The damage is not yet irreparable, but the present state of our former pine forests indicates the need for amended treatment of remaining conifer stands; otherwise we shall not hand on to succeeding generations forests which will approach in quality or quantity the virgin stands which are now being cut.

In case the foregoing words have given the impression that forest industries, in the past, have been the chief cause of forest destruction, it should be emphasized that settlers and private owners of woodlots, with due allowance being made for their capabilities and facilities, have practiced less in the way of reasonable forestry methods and conservation than have the larger commercial operators. Some of what are potentially the most productive, but actually the worst managed forest lands, are in or adjoining the earliest settled portions of the Province. Since these lands are close to the consuming market and have the best growth and moisture conditions, they present possibilities for an exceedingly profitable field in the matter of reforestation and management.

The history of the past hundred years in this Province indicates that most of our forest problems have existed in one form or another throughout this period. The number of Commissions and Committees set up to enquire into these various problems, without appreciable result, demonstrates that something more than a Commission of enquiry is needed. It is apparent that public apathy, selfish interests of individuals and sometimes political expediency have, in the past, all had a share in delaying the rational utilization of our forests.

I cannot end this chapter more suitably than by quoting from a report of a Special Committee of the Legislature in 1863. It indicates the necessity for publicity before any change in forest policy is made by the Government.

> "Your Committee . . . would further recommend that wherever even any minor change in regulations may be thought advisable, it should be published for at least three months before any Order-in-Council be passed to give effect to it, so that the Trade may have an opportunity of being consulted in regard to the change contemplated."

If the word "Public" were substituted for the word "Trade", the above recommendation would fit the needs of the present day. An enlightened public on guard against unwise exploitation of its forest resources is the influence most likely to assure the perpetuation of these resources for future generations.

CHAPTER II

Commission Organization and Activities

Letters Patent creating the Ontario Royal Commission on Forestry were issued only on April 16th, 1946. I had commenced work, however, on March 11th. An organization had to be set up, a staff gathered together, office premises found, office equipment purchased and plans and arrangements completed for the field work which, if not under way early in May, would not have been completed in the same year.

After a long search, satisfactory head office accommodation was obtained in the Administration Building of the Small Arms Plant at Long Branch, and the following staff was appointed:

PERSONNEL

Legal Counsel ..... Donald Guthrie, K.C.

Head Office

Office Manager and Accountant ..... R. P. Egerton, C.A.
Secretary of the Commission ..... Major W. H. Hewson, B.A., LL.B.
Secretary-Steno to the Commissioner ..... Miss M. E. Edmondson
Stenographer ..... Miss A. Cory

Field (Mobile Office)

Four Forest Engineers ..... E. S. Davison, M.F.
J. F. Turnbull, B.Sc. F.
J. Miles Gibson, D.Sc., O.B.E.
E. S. Fellows, M.Sc. F.

Field Clerk and Stenographer ..... S/Sgt. A. Barry
Field Draughtsman ..... A. Dudman
Cook

In addition, the Department of Lands and Forests of British Columbia, for the period May 17th to August 1st, loaned to the Commission the services of E. W. Bassett, B.A.Sc. (For.), their officer in charge of fire protection. His services were invaluable in the study of fire protection methods, personnel and equipment. He has keen powers of observation, and his advice on many other phases of the work, in addition to fire protection, was often sought and freely given. The Royal Commission is indeed grateful to the Minister and to the Deputy Minister of Lands and Forests of British Columbia for Mr. Bassett's services.

The Royal Commission also sincerely appreciates the action of Purdue University, Indiana, in granting leave of absence to Prof. Lloyd VanCamp, a

former Canadian and graduate of Toronto University, now Extension Forester there and an acknowledged expert in matters pertaining to farm woodlots. He ably assisted the Royal Commission in organizing and carrying out the farm woodlot survey. His counsel, vast knowledge of the subject and genial personality were of great importance in this phase of the work of the Commission.

Brigadier George M. Grant, now Assistant General Manager of the Bell Telephone Company and formerly officer in charge of the Royal Canadian Electrical and Mechanical Engineers Corps (R.C.E.M.E.) of the Canadian Army in Europe, has rendered outstanding service in assisting the Royal Commission in studying the administrative organization of the Department of Lands and Forests. The Royal Commission is indebted to the Bell Telephone Company for making his services available, and to Brigadier Grant who was unsparing of his time and unsurpassed organizing ability.

APPROACH TO PROBLEM

Throughout the whole course of my inquiries, the guiding purpose which I have kept steadily in mind has been the attainment of "Total Forestry", which I would define as the complete utilization of the forest resources of the Province for the greatest use and enjoyment of its people.

It was realized at the outset that the narrow concept of forestry, namely the growing of trees and the removal of wood products in various forms, has influenced the public viewpoint to the almost total exclusion of the other very important functions which the forests must perform in the rational development of the social and economic life of the Province. Forests are the main factor in controlling stream flow, in preventing floods and erosion, in maintaining soil water levels -a matter of increasing concern in much of the agricultural area of the Province—and in providing a habitat for most of the wild life of the Province. This latter function is basic to the recreational values of our countryside and, if neglected, tourist enterprises which are potentially so valuable to Ontario will never reach their optimum development. It is quite feasible to have forested areas close enough to centres of population so that all classes, particularly children, may have an opportunity of enjoying them. In addition, it may be demonstrated that they are a profitable investment in the economic as well as in the social sense.

The closer co-ordination of various basic industries such as agriculture, forest industries, mining, hydro-electric development and tourist activities was visualized. What has happened in the past shows that much can be done to eliminate waste and provide a more rational and co-ordinated development of these resources which are, or may become, important to more than one Government department dealing with the above industries.

It was ever kept in mind that the vast bulk of our forests, whether or not leased for varying periods to forest industries or operators, still belongs to the Crown or, in other words, to the people of the Province. The majority of these real owners live in communities remote from any of the larger forested areas. For this and other reasons they have so little opportunity of seeing or using their forests that they do not comprehend their ownership and the responsibility involved. Even those who live in, or on the fringes of the larger forested areas seldom appreciate the importance of perpetuating their resources.

Finally, there had to be faced the problems created by many operators

with selfish interests, whose development programmes and outlook do not go beyond a decade or two and whose practices are detrimental, not only to the general public, but also to themselves.

It was, therefore, with some knowledge of existing conditions, yet with high hopes of finding means to improve them, that the Royal Commission embarked on and carried out its studies of the forests of Ontario.

FIELD WORK

A Canadian National Railways colonist car was converted to a mobile office by removing six sections at one end and installing desks, filing cabinets and a draughting table. The remainder of the car was utilized as sleeping and living accommodation.

At each location at which the car stopped, the District Forester had a tent erected which served as cookery and dining room for the Commission staff and as living quarters for the cook. Cooking utensils, china and food were carried on the car. Beyond the normal difficulties encountered in obtaining and retaining cooks, the living and working arrangements left little to be desired.

Stops varying in length from eight to fourteen days were made at the following points: Pembroke, Temagami, Shebandowan, Minaki, Sioux Lookout, Armstrong, Geraldton, Orient Bay, Mobert, Oba Lake, Moonbeam, South Porcupine and Biscotasing. Shorter stops were also made at Kawene, Mine Centre and Hearst.

These locations were chosen because they provided siding facilities close to suitable flying bases for pontoon-equipped aircraft, thereby making feasible a complete coverage of the forested areas of the Province.

At all times the Commission had at its service one aircraft, with an extra one on some occasions, provided by the Provincial Air Service. Without this method of transportation, it would have taken several years to complete the work done by the Commission staff between May 6th and September 20th.

Map No. 7 indicates the specific areas inspected by the Commission staff. Where there were roads and motor transport was available, inspections were made by this means. Sometimes only boats or canoes could be used, but the vast majority of inspections were made by means of air transport to the vicinity and travel on foot to and over the area inspected.

It will be noted that all forested areas of the Province were covered, from Quebec to Manitoba and from the American boundary to the Severn River in the north.

The engineering staff of the Commission flew in all weather, only requiring that the hill-tops be visible. On many days, in order to deliver the various members to their different destinations, ten or twelve ascents and descents were made, on and from water usually unfamiliar to the pilots. The fact that neither aircraft nor personnel were injured in the hundreds of landings and take-offs speaks volumes for the efficiency of the Air Service.

Not all camps of all operators were visited, but some member of the Commission staff visited a sample of woods operations of every large or medium-size industrial concern in the Province, whether it be engaged in the manufacture of pulp and paper, the production of lumber, the cutting of ties and poles,

or the export of pulpwood. In the case of the large companies, operations on each of their limits were inspected. Not only were recent cuttings examined, but those of past seasons were checked for evidence of new growth and the cutting practices utilized. Where their history could be ascertained, old cuttings of 20 or 30 years ago were included in the survey, as were also old and recently burned areas in both cut-over lands and virgin forest.

Inspections were made in a uniform manner and reported on standard forms. Consequently, the Commissioner or any member of his staff would observe and report on the same elements, whatever area was visited. Each report called for observations on operating practices; waste (such as high stumps, large tops left, timber felled and left on ground, timber left standing which should have been cut, etc.); labour conditions, including housing; indications of efficiency or otherwise; the compliance with or neglect of regulations; any evidence of fish and game and the tourist possibilities; the type of roads and equipment; the number of men employed, etc. Normally, scalers who had previously measured wood in the area acted as guides and in order that a fair sample should be shown to the Commission, the particular areas or camps to be inspected were not arranged beforehand but were selected by the engineer making the inspection on the date of the inspection.

Many hundreds of photographs were taken. These are all catalogued and copies have been attached to the reports concerned.

In addition to field inspections, the Commissioner and members of the Commission staff have visited the wood preparation plants of every pulp and paper mill in the Province, nearly every sawmill sawing more than one million feet board measure per annum, many smaller sawmills and the two pole and timber treating plants operating in Ontario. Notes on the equipment and processes of all plants were made.

One result of this effort has been the compilation of probably the most complete and up-to-date data that has ever been assembled on the methods, processes and equipment of the wood-using industries of Ontario and the resources which supply them.

Throughout all the survey work involved, the matter of urgency was the keynote. It was felt that the field work *must* be completed before the winter set in and that the report *must* be prepared with the least possible delay. Only the most loyal co-operation of the field staff made possible the completion of the survey during the open season. They devoted practically every Sunday and every legal holiday to inspections, usually being in the air by 8.30 a.m. and spending about 10 hours per day in the field, often more. Notes were written at night. I mention this service here as I feel that such unstinted devotion to duty should at least be drawn to the attention of the government.

WOODLOT SURVEY

In addition to the above survey of operations on Crown lands, three Commission engineers spent seven weeks travelling by road, separately, over the southern portion of Ontario inspecting farm woodlots in every County. Government officials, County Councils, County Assessors, personnel of wood-using industries and interested individuals were questioned. Accordingly, a splendid over-all picture was gained of the conditions existing and the remedial measures already undertaken; in addition, some ideas were obtained as to the measures

which should be undertaken in the future to meet the challenge presented by the existing state of this most important element affecting the future prosperity of this Province.

PUBLIC HEARINGS

Scheduled Public Hearings commenced on October 28th. Meetings were held in Sault Ste. Marie, Port Arthur, Kenora, Fort Frances, Geraldton, London, Cochrane, North Bay, Pembroke, Ottawa and Toronto.

The Commission sat for 39 days, 142 briefs were presented and well over half a million words were taken in evidence. The response of the public was gratifying and much useful information and many sound recommendations were received.

CHAPTER III

General Impressions and Observations

One cannot spend a season in an intimate study of the forests of the Province, and the manner in which they are being operated and administered, without forming some broad general impressions which are relevant to any report on existing conditions and recommendations made to improve them.

WASTEFUL METHODS

The most striking impression made on the staff of the Commission has been the tremendous, almost incredible, waste resulting from single-purpose operations carried on in the past and still being carried on by most of the operators. Few sawlog operators produce pulpwood occurring in the stands they cut over. (In fact, many of their leases or permits do not allow them to do so.) Few pulpwood operators cut sawlogs occurring in their pulpwood stands, except to a very limited degree for their own use. (Again, many of their licenses do not permit them to cut sawlogs.) Much material of pole and tie size, and eminently suitable for these purposes, together with pulpwood and sawlog material, is therefore left on many areas widely scattered across the Province. In a number of cases, the material remaining is not sufficient in quantity to justify an economical separate operation later and, in any event, the trees so left usually die of sunscald within three to five years, or are blown down and form a fire hazard.

Pulpwood operators tend to concentrate on spruce, for two reasons:

(1) Pulp and paper makers prefer spruce, particularly black spruce, because of its high yield and strength and its satisfactory behaviour in manufacturing processes.

(2) Pieceworkers on woods operations prefer black-spruce-swamp stands because the trees are rarely very large, are reasonably uniform in size and are free from heavy limbs; from swamp stands there is a high yield in cords per acre and consequently the potential earnings are high.

In addition to the main reasons cited above there are secondary reasons, such as an ill-founded belief amongst Ontario operators that extremely high sinkage losses occur in balsam. There is also the woodsman's dislike for handling green balsam on account of its gummy nature which soils hands and clothes much more than either spruce or jack pine. Jack pine does not find favor amongst paper makers except in the manufacture of kraft and, particularly in this Province, its use has not been widely developed in making other pulps and papers.

The following tabulation based on the annual returns of the Department of Lands and Forests for 1945-46 indicates the percentages of coniferous pulpwood species cut in this Province and the percentages exported, compared with the

percentages existing in the forests of the Province as revealed by the Report of the Forest Resources of Ontario, prepared in 1930.

	Total Stands	Total Cut	Cut for Export
Spruce	63.3%	81.7%	81.0%
Jack pine	27.7%	11.6%	12.1%
Balsam	9.0%	6.7%	6.9%
	100.0%	100.0%	100.0%

This indicates a heavy overcut of spruce, with a corresponding undercut in jack pine and balsam. In many mills in Quebec and New Brunswick, balsam constitutes over 40 per cent of the pulpwood supply and, in some cases, almost double that percentage. Sinkage losses are higher than in spruce but not high enough to deter the companies concerned from using the full balsam content of their various stands. The percentage of jack pine utilized in the manufacture of groundwood pulp is much higher in mills outside the Province than in mills in the Province of Ontario. Jack pine utilization in some newsprint mills in Canada exceeds thirty per cent of the groundwood pulp content.

Excessive Waste in Road Building

The advent of the bulldozer in road construction has ushered in an era of waste from that source. Few woods operators now clear the right-of-way before construction and, as a result, excessive waste is caused and potential fire-hazards created. Workmen do not like to work in the resultant tangle because it slows their rate of production and the sand and earth embedded in the tree trunks

Excessive waste from bulldozing a road before cutting the right-of-way. (Pulpwood-exporting company operation.)

Excessive waste beside a truck road. (Domestic paper company operation.)

dulls their tools. Hundreds of miles of road exist with waste material similar to that shown in the accompanying pictures. Clearing of the right-of-way before bulldozing should be rigidly enforced.

DISTRIBUTION OF CROWN LANDS

The illogical allocation of Crown lands to operators has also made a marked impression. In many instances, timber areas held by operators have little relation to the present needs of the units of industry concerned. Some have much more than their mills, as presently constituted, can possibly use while others, particularly the vast majority of the sawmilling group, can foresee their extinction due to lack of timber in periods of time varying from two to 25 years.

Areas containing much, if not most, of the remaining stands of timber suitable for sawlogs are included in pulpwood concessions. Areas of timber, certainly not yet overmature, are now being cut over for pulpwood to be exported in an unmanufactured state; while some domestic mills whose future with respect to wood supply is far from clear, within a measurable period will have to transport wood from more remote regions beyond the areas now being cut over for export. The cutting of quantities, far beyond the actual annual growth under current silvicultural practices, is common on many limits, particularly amongst the sawmill group and the export group. Conversely, other large areas of limits are not developed to an extent approaching their possible sustained-yield because the present manufacturing capacity of the limit holders concerned cannot utilize the annual growth of such large areas.

The practice in Ontario, and elsewhere, of allotting limits in rectangular shapes, instead of conforming to single watersheds or groups of watersheds, frequently prevents the logical and economical development of a considerable portion of the area involved because of its location on a watershed which does not naturally serve the mill concerned.

Throughout the years there has been no enduring policy concerning the leasing of forest lands to the various interests. Political expediency at times seems to have entered into negotiations and at all times the bargaining capacity of the units of industry or commerce concerned has made itself apparent. The diversity of the clauses and conditions in the leases, under which the Department of Lands and Forests now staggers, will be treated in Chapter IX.

The bald facts are that it was formerly so easy to get annual permits to cut timber, without assuming the financial and other obligations entailed in the holding of timber areas, that many operators acquired the rights to cut over forest lands on a shoe-string basis and did not realize, until it was too late, that pulpwood concessions and reserves had been granted on such a scale that there was little timber-land left available, except in the northwestern portions of the Province on the waters of the English and Albany Rivers.

A casual glance at a map may induce some to think that there are still vast untapped forest resources in the far north. True, there are still considerable areas not yet exploited, but their extent is not nearly as great as many believe. From Hudson and James Bays westward there are tens of thousands of square miles of desolate waste swamp-land of the kind graphically portrayed in the two accompanying plates. Here, poor drainage rather than extreme climatic conditions is responsible for the absence of forests of commercial value. Moderately good

Sub-arctic swampland on the James Bay Coastal Plain near the Attawapiskat River. The dark patches are pools of stagnant water, the rest is moss. There are thousands of square miles of swampland similar to this.

Sub-arctic swampland. Note how the drainage provided by the small stream on the left induces some scrubby tree-growth near its banks. Even if accessible such timber would be valueless for commercial purposes.

timber grows in fringes along the water courses, but this deteriorates progressively as the distance from the banks of the streams increases until, at about one-quarter of a mile back from the shore, only worthless scrub exists. Thirty-five miles from the mouth of the Albany River, spruce up to 27 inches in diameter was observed in the narrow strip of timber near the water, but the tenuous nature of these fringes is such that their exploitation is out of the question, at least for many years to come. Even if it ever becomes feasible to exploit them, they will yield comparatively little wood.

ABILITY OF THE FORESTS TO RECUPERATE

Another striking impression gained is that of the tremendous capacity of the forests to heal the wounds made by both man and nature. It is amazing how the appearance of once devastated areas changes in a quarter of a century. Given a chance and a little assistance, nature can largely correct most of the damage done to our forests, except in the case of red pine and white pine. Outside the Ottawa Valley and areas which may be planted in Southern Ontario, it is unlikely that these species will predominate over any considerable area of the Province within the next century.

LACK OF ROADS

Mention of the lack of roads necessary for rational development of the forests cannot be neglected. Without a tremendously expanded road system, we cannot hope to practice sound silvicultural methods. In the past, due to

the fact that forest industries in Ontario have depended almost entirely on water transport for wood delivery, operators have perforce cut only the conifer species which will float. Further than that, practically all operators, whether their needs were for sawlogs, pulpwood, ties, or poles, took only the sizes and species of conifer in which they as individuals happened to be interested. This has resulted in a tremendous upset of the original balance of species, and quantities of both hardwoods and softwoods have been left to blow down or die of sunscald. The overmature or otherwise weakened stands, in turn, have left the forests a prey to fire and insects as it is such stands which constitute some of the highest hazards of insect epidemics or fire, or both.

I recommend that a widely expanded road-building programme, jointly agreed upon by the Departments of Highways, Agriculture, Mines, Lands and Forests, and Travel and Publicity, be undertaken with the aim of opening up every major watershed. Unless trunk road systems are provided, we cannot hope to utilize anything approaching the maximum output of our forest areas in wood products, or to reap the greatest advantages in recreational and tourist activities.

SAWMILL SITUATION

Evidence as to the precarious position of the lumber industry has been presented by the Chief of the Timber Management Division of the Department of Lands and Forests and by many of the lumbermen concerned. Not more than two or three per cent in number (representing between twenty and thirty per cent of the annual output of lumber) of the 1,147 licensed sawmills in the Province have sufficient limits to permit of sustained operations at any figure

Jack pine suitable for ties and poles left standing after a spruce pulpwood cut. These trees will die and be blown down. (Domestic company operation.)

Merchantable pulpwood left after cutting. Note the abandoned pile-bottom (lower right).
(Pulpwood-exporting company operation.)

Merchantable pulpwood left standing. (Pulpwood-exporting company operation.)

approaching their present output, unless remedial measures are taken. The remainder of the mills, with the communities dependent upon them, can only await extinction, with casualties commencing at a very early date. A solution of this problem will be suggested.

PULP MILL SITUATION

In relation to their individual long-term requirements, the supply of wood from this Province for domestic pulp and paper mills varies widely.

Some mills, in the past, have been dependent on other Provinces for a large, if not a major proportion of their pulpwood. In some instances, this wood is transported past mills outside Ontario which are themselves in short supply. Shipments of wood from other Provinces may at some future date be curtailed or stipulations may be imposed which could effectually reduce, or even eliminate this source of supply. If such an occasion should arise, mills in Ottawa, Hawkesbury, Cornwall, Thorold and Merritton may be forced to curtail production to such a degree that the communities would suffer most severely.

A few domestic mills are known to have limits which appear to provide little or no opportunity for a future increase in production. In some cases, areas have been leased, under agreement to pulpwood exporters, which would have furnished the logical and economical source of raw material to provide for such expansion. Only a complete survey of the forest resources of other mills will disclose their position.

A few mills obviously have more than enough area under agreement to permit of continuous operation on a much larger scale. Curiously enough, one of these companies has agreed in its contract not to increase the capacity of its mills. Another company has ample, indeed more than enough, area to sustain its domestic mills, but its privilege of exporting an amount equal to its domestic consumption could result in the rapid impoverishment of its limits if such consumption were to expand to any considerable extent.

POLE AND TIE OPERATORS

There are two pole and tie treating plants now operating in Ontario. They are largely dependent for their raw materials on agreements made with limit holders producing pulpwood or sawlogs. This prevents long-term arrangement for continuous supply, as such agreements cannot normally be made more than a year or two in advance. One timber treating company has limits, but they are insufficient to produce, in perpetuity, any quantity of material commensurate with probable future requirements.

I believe that supplies so vital to the operation of our railways, hydro networks and communication systems should be organized on a perpetual basis, and recommendations to that end will appear later in this report. I want to emphasize here that much material, eminently suitable for sawlogs, poles and ties, is now diverted to other uses or is left to die and decay after single-purpose operations.

BALSAM CONTENT IN FUTURE FORESTS

There is no escape from the impression that past and present cutting practices in Ontario will result in a higher percentage of balsam for the next cutting-cycle

Small timber cut for sawlogs, Compare with pieces in pulpwood piles on page 104.

High-grading in pulpwood cutting. Note the patches of mixedwood in the foreground and the scattered hardwood left standing through the cut-over area. (Pulpwood exporting company operation.)

than is now present. Current industrial utilization does not approach full use of the balsam content of the original stands, let alone the higher percentage almost inevitable in the future. The spruce budworm prefers mature balsam stands and epidemics normally originate there, followed by extremely disastrous losses. The result of possible future epidemics of this pest can only be more serious as the balsam content of the forest increases. A better balance between species than is indicated by current reproduction is therefore a prime necessity.

PROVINCIAL AGENCIES WASTEFUL OF FORESTS

I regret to say that the Hydro-Electric Power Commission of Ontario has not applied ordinary forest conservation practice, except to a very limited degree, on most of its major projects in the last quarter of a century. Failure to clear trees from the site of storage reservoirs before inundation, which might have been insisted upon by the Department of Lands and Forests, has resulted in considerable loss of timber and, worse still, has left unsightly and dangerous tangles of tree trunks and debris covering tens of thousands of acres. These wooden barriers will remain for several decades, a menace and an expense to recreation seekers and forest operators who may wish to use these waters.

The story has varied little with the passing years. Lady Evelyn Lake, north of Temagami, dammed in 1925, Montreal River (Algoma District), Marmion (Moose) Lake at Steeprock, Lac Seul, Long Lac, Ogoki Reservoir, all bear evidence of the same lack of consideration concerning conservation of timber, aesthetics, and economy of future forest operations.

I consider that works of a public nature should set a high example to private industry in matters of forest conservation but such has not been the case. Limit-operators, in general, have similarly left uncleared the areas to be inundated by dams for the control of stream flow for driving operations.

Submerged area, Ogoki storage reservoir. Many square miles are submerged in this manner.

Submerged area, Lady Evelyn Lake power storage-reservoir after twenty-five years of inundation. Debris of this nature will remain for many decades.

Typical view of the shoreline of McKenzie Bay, Lac Seul. Such shores make landings with aircraft or small watercraft impossible except on calm days. Flooded in 1927.

Landslide on the Little Jackfish River. The bank is cut back over 200 feet at this point. Ogoki Diversion.

Submerged area above a log-storage dam, Opikinimika River. Note the logs scattered amongst debris.

Calm Lake Reservoir. A close-up view of the debris along the shore. Flooded in 1927.

Submerged area, Wakami River, caused by a dam built to facilitate log driving. Flooded in 1928.

OPERATIONAL CONDITIONS AFFECTING FORESTRY

There are many ills affecting forest operations on Crown lands. There is, in general, a tendency to blame everything on the operator. In my opinion this is far from fair, for the following reason.

Up to the present time, the general public has ignored or failed to comprehend the fact that only by sensible and rational utilization of our forest resources can we hope to maintain the forest industries and their dependent communities in perpetuity. This failure by the general public to appreciate the situation has been reflected in government and industrial forest policies, or the lack of them. If sensible and uniform laws and regulations are provided and uniformly applied, the great majority of operators are, I feel, ready and willing to implement them fully. Severe penalties, again uniformly applied, will rapidly bring the reluctant operators into line.

In most of the larger units of forest industry in this Province, organization, financing and planning have been directed toward the production of raw materials and the processing, manufacture and sale of finished products. On the other hand, the renewal of the forest resources, the lifeblood of the enterprises concerned, has been largely left to chance.

The main reason for this situation is that few top executives of the major components of our forest industry have had any training, either academic or practical, in the operation of forests. In general, they have achieved their dominant positions in the industry by way of mill operations, finance, sales or accounting. The result is that so long as wood is made available they continue to concentrate on production costs and sales and, beyond the cost and the assurance of an immediate supply of wood, pay comparatively little attention to the operations of the forest. I gained the impression that a majority of top executives have carried out few inspections of their woods operations and that in most cases any inspections which were made were a by-product of their occasional visits to the company hunting and fishing lodge on the limits rather than for the purpose of a critical analysis of forest conditions affecting labor and the efficient utilization of effort and material.

It is customary for companies to appoint a Vice-President in charge of Woods or a Woodlands Manager, who has risen to the position through forestry or wood-production activities. His work includes planning, government contacts, attendance at industry and association meetings and conferences, and entails responsibility for policy and personnel matters. He normally becomes so submerged by such activities that he has little time to visit the woods and is lucky if he can call at branch headquarters once or twice a year.

Next in line comes the local Divisional Manager. He, in turn, is harassed by varied problems of management and construction, labor, personnel, supply and estimates, income tax deductions and, during the War, the multiplicity of returns occasioned by rationing and Selective Service. He may get to his headquarters depots once or twice during the cutting season but he is fortunate if he can visit the odd camp, where the cutting is being carried on, even once during the season.

The result has been that in most cases production quotas have been allotted to the various camp foremen who have been held responsible for their fulfilment. They have done their best under the circumstances but if the forest must suffer in order to produce those quotas, then the forest, rather than the quotas, feels the effect. That such is the case is borne out by the fact that widely varying conditions may normally be found in adjoining areas operated by the same company. This was apparent in all parts of the Province.

I am convinced that senior executives, who demand the highest standards in housekeeping and prevention of waste in their mills, would be horrified if they were to travel over their cut-over areas and see the waste of material and effort in the woods.

The solution lies in an increase in supervisory staff, both technical and practical, probably on a scale amounting to four for each one now employed. I am convinced that on most operations three times the money spent in tripling or quadrupling the supervisory staff would be returned in savings due to the elimination of waste effort and waste material. The government should urge all senior executives of forest industries to give thought to the disparity between the numbers of men supervised on woods operations by one superintendent or one foreman, as compared to the numbers of men whose work is supervised by a similar foreman in the mills. It will be found that while one foreman in the mill has probably thirty or forty men working in a closely knit group and under shelter, his bush counterpart has one hundred or more men spread over several square miles of forest and exposed to the elements over which he has no control. A snowstorm or rainstorm may easily cut the efficiency of a working crew in half.

More time-studies, technical control and supervisory staff are sadly needed in the forests and their provision can be made to pay big dividends. Much, if not most, of the poor forestry practice now carried on would thus be eliminated, because practically all the wasteful practices can be demonstrated to be unsound economically.

So that my reasons for writing the above critical paragraphs regarding forest operations may not be misinterpreted, let me reiterate my previous suggestion that abuses exist because an informed public opinion does not insist that government policy demand a more rational development of our forest resources. My acquaintance amongst industry executives and operating personnel is wide and I believe that the vast majority of them, if given practical and uniform laws and regulations, uniformly applied, would heartily subscribe to and observe all measures which will perpetuate and improve our forest resources.

NEED OF CO-OPERATIVE EFFORT

An important impression that I wish to record is that created by the apparent hostility, bordering on distrust, evident between the different groups of forest industries and even between members of the same group. The lack of co-operative effort is unsound and costly, and results in much waste on operations due to lack of interchange of products. Concerted efforts to eradicate this unfriendliness would pay worthwhile dividends.

Waste resulting from poor supervision of cutting. Two thirteen-inch and two twelve-inch spruce trees left standing by piece-workers within fifty feet of a skidway on a sawlog operation.

Government and industry should endeavour to achieve a greater spirit of mutual trust and confidence. A wider and freer exchange of ideas would be beneficial to both groups.

PERSONAL CONTACTS OF DEPARTMENTAL OFFICIALS WITH DISTRICTS

As the distance widens between Toronto and the outlying districts, there is evidence of a lack of personal contact between Head Office staff and the District staffs, which is more or less proportional to the distance of the latter from Toronto. Shortage of personnel is probably the main reason why this lack of contact persists. Whatever the reasons, they should be eliminated, and frequent visits of several days, not hours, should be made by all senior staff at Head Office to *all* Districts. When these visits are made they should be of the nature of field inspections, rather than calls at the District Offices.

This subject will be developed in a later chapter.

ADMINISTRATIVE CONDITIONS AFFECTING WOODS OPERATIONS

It would appear from the foregoing that there are many things which need correction administratively. These will be covered later in some detail. At

this point, however, I should like to pay a tribute to the staff of the Department of Lands and Forests. With very few exceptions they are an intelligent, capable and industrious group of men who deserve great credit from the people of this Province.

They are, however, sadly inadequate in numbers and badly overburdened with administrative problems. Senior personnel lack trained assistants who can carry part of the load, particularly the routine administrative detail which must be performed if chaos is not to result. This applies to District Foresters and Chief Rangers. Forest Rangers, in many cases, have overlapping duties to do with scaling, fire protection and fish and game activity. In addition, the added (necessary) burden of re-assessment of all government lands has laid an extra administrative load on ranger personnel, which will interfere with their normal duties for several years to come. Scaling and inspection work generally, which is really the core of all timber management endeavour, cannot but suffer as a result of the extra burdens placed on an already inadequate staff of scaling personnel.

Many, if not the majority of, scalers have now reached or passed middle age and can no longer hope to do the amount of bush travelling on foot which is required of such personnel. Only a much widened programme for the training of scalers, and salaries which will attract bright young men into the trade, will bridge the present gap that exists between the numbers of scalers needed and the numbers available.

CHAPTER IV

Forest Industries*

It is not my intention to compare the forest industries of Ontario with other basic industries in the Province. I consider the forest industries sufficiently impressive in themselves. In any case, the statistical data on the forest industries, though similar, are not strictly comparable with those on the other basic industries.

It is customary to look upon lumbering and pulp and paper manufacturing as constituting the forest industries and, in general, to disregard the production of ties, poles, Christmas trees, etc. Nor is proper attention given to the number of industries using wood and paper which are dependent upon, and would never have been developed except for, the production in their proximity of the necessary raw materials. All these groups will be treated in appropriate chapters of this report.

The thought might well be put forward that the tourist business and fish and wildlife enterprises should be classed as forest industries and I believe that future developments will make this classification logical. For the purpose of this report, however, they will be considered in a separate chapter.

EFFECT OF WAR ON FOREST INDUSTRIES

The war years and years immediately following the war is not a wholly satisfactory period to use in an analysis of industry. The dislocation and difficulties which result from war are recognizable, and possibly some of their effects should be noted.

The pulp and paper group, whose product was marketed mainly in the United States, were under rigid government controls as to prices, production quotas and mill salary and wage schedules. The lumber group, particularly the larger permanent mills, suffered even greater dislocation of their normal routine; they were forced to sell one-half to two-thirds of their output in local markets at rigidly fixed prices, which in many cases were not reflected by overall costs and did not allow a proper differential between the different grades. The inevitable result was that the older and more reputable operators were penalized to the advantage of the owners of the smaller temporary mills and the less scrupulous operators, many of whom, with the connivance of black market customers, could and did flout the price ceilings by the manipulation of grades and by under-measurement. The mill salaries and wage schedules of the lumber group were also closely controlled, though in some mills wage controls could be evaded by paying wages at piecework rates.

Until recent months, woods labor earnings have borne little resemblance to established wage ceilings and, as is usual when the anchor is gone and the vessel allowed to drift, results have been most erratic. The operators cutting pulpwood for export have played a major role in the ascending piecework spiral

*Pulp and paper mills and sawmills are shown on Map No. 11. Distribution of private and public lands is shown on Map No. 8.

which has reached a point where I consider it threatens the continued well-being of the primary forest industries of the Province.

For several years past, rising piecework rates included bonus payments previously unheard of, such as those for deep snow encountered, cutting of strip-roads, cash payments for trips home, etc. Few, if any, operators were able to avoid being caught up in the spiral which now permits pieceworkers to earn $12.00 to $15.00 in an 8-hour day, with corresponding day-labor rates pegged at $6.20 per day. The inevitable result has been that work on a day basis has almost vanished and piecework rates have been established for practically all phases of woods effort. This has created some most undesirable conditions from the standpoint of forestry and conservation.

For instance, the production of sawlogs has been traditionally and properly on a daily or monthly wage basis because quality of product is of greater economic importance than quantity of output. Care taken in sawing up the felled tree can produce not only more lumber, but higher-grade lumber than may otherwise result. A majority of the sawlogs produced under piecework conditions throughout the Province are merely 16-foot sections of tree, with little thought given to minimizing curves or other defects.

The more undesirable, but nonetheless necessary woods jobs remain undone because the high piecework rates for cutting permit men to earn all they desire under present income tax laws. An increase in rates for the less desirable work will again start the ascending spiral for cutting rates.

I mention this subject again in Chapter XVI on Woods Labour. It is discussed here only because of the relative effect of piecework on the major primary forest industries.

EMPLOYMENT PROVIDED

During 1945, some 42 pulp and paper mills in Ontario gave work to approximately 12,000 employees and paid $26,500,000 in salaries and wages.

In the same period, 1,147 licensed sawmills in the Province gave work to approximately 7,000 employees and paid a little over $7,000,000 in wages and salaries. Sawmills in Ontario are usually operated for about six months in the year or less, as open water is necessary for transporting the logs to most of the mills.

It is difficult to make an accurate segregation of the data on the different industries carrying on woods operations in Ontario. In 1945-46 they collectively employed upwards of 29,000 seasonal workers, practically all males. Up till July, 1946, many prisoners-of-war were included in this figure. Wages paid amounted to roughly $44,000,000 for the season (brief of Ontario Forest Industries Association). In addition, some thousands (estimate 7,000—brief of Canadian Pulp and Paper Association) were employed on private lands producing pulpwood valued at $11,000,000 for domestic mills and export.

In addition to these primary industries, there are secondary industries with nearly 2,000 plants using pulp or paper or lumber as the primary raw material and, though some of these would continue in operation whether or not their primary industries within the Province were closed, it is safe to say that the vast majority are in Ontario because of the supplies of local raw material available. These secondary industries provide work for upwards of 51,000 men and women and their payrolls approximate $75,000,000. Secondary industries using wood

range from establishments manufacturing furniture to those producing coffins, tool handles, fruit baskets and even stepladders; those utilizing pulp or paper cover the field from printing and book binding to the manufacture of pie plates. Furniture establishments alone number 208, employ 7,842 men and women with an annual payroll of over $11,300,000 and turn out products worth $29,000,000.

Summary of Employment

PRIMARY INDUSTRIES	
19,000 employees—payrolls	$ 33,500,000
WOODS OPERATIONS	
29,500 employees—payrolls (seasonal)	44,000,000
SECONDARY INDUSTRIES	
51,000 employees—payrolls	75,000,000
99,500	$152,500,000

EFFECT ON AGRICULTURE

Not only do the primary forest industries offer healthy and gainful employment in the woods to spare off-season farm labor, but they purchase large quantities of farm produce. This amounts to about $16,000,000 (Ontario Forest Industries Association brief) in a normal year and includes fresh and canned meats and vegetables, flour, butter, lard, hay and oats, etc.

EFFECT ON HYDRO DEVELOPMENT, TRANSPORTATION AND INDUSTRY

The primary forest industries are larger users of hydro-electric power in the Province than any other group, spending roughly $4,000,000 for that purpose. They pay transportation systems tens of millions of dollars, which constitute a very considerable proportion of the railway revenue, and it goes without saying that their purchases of machinery, chemicals, mill supplies and fuel are similarly impressive.

If, by any mischance, these tremendous forest industries should be seriously curtailed, it can readily be seen that within the industry many thousands of employees and their dependents, as well as many more thousands in agriculture, transportation, hydro and industry generally, will suffer severely.

CAPITAL EXPENDITURES AND FIXED CHARGES

Pulp and paper mills require tremendous capital expenditures before they can produce a single ton of pulp. They are often located far from centres of population and whole towns, with all amenities, have to be constructed, in addition to the mills. An expenditure of $50,000 to $60,000 or more per ton of daily capacity is not unusual (400-ton mill $20,000,000 to $25,000,000) before it is possible to produce pulp or paper. The investment in mills forms one of the fundamental differences between pulp and paper operations and lumber operations. In the former case, the cost of the mill far outweighs the costs of the

limits and the facilities for producing wood. In the latter case, the investment in limits and facilities to deliver logs may easily be greater than the cost of the mill.

The factor of mill investment has a profound effect on the probable course of action of the two industries when production falls to a low ebb. The pulp and paper mill has such a burden of capital investment that, with high fixed charges for taxes, interest on securities, maintenance and depreciation, it will probably continue to operate until the loss per ton of production exceeds the fixed charges. This was exemplified during the depression years in the early thirties. The only mills to close were those which were units in a group where production could be transferred to and carried on more cheaply by other mills in the same group. The single mill, once established, cannot afford to close until unit losses exceed unit fixed charges.

On the other hand a sawmill, not having so much overhead, can reduce production drastically and even close down completely for a season, without necessarily going into bankruptcy. Such action, however, is most undesirable and causes a grave dislocation in the affairs of all concerned, particularly the wage earner.

A comparison of the trends in the two major primary forest industries in Ontario is interesting and possibly instructive. The pulp and paper industry will be dealt with first.

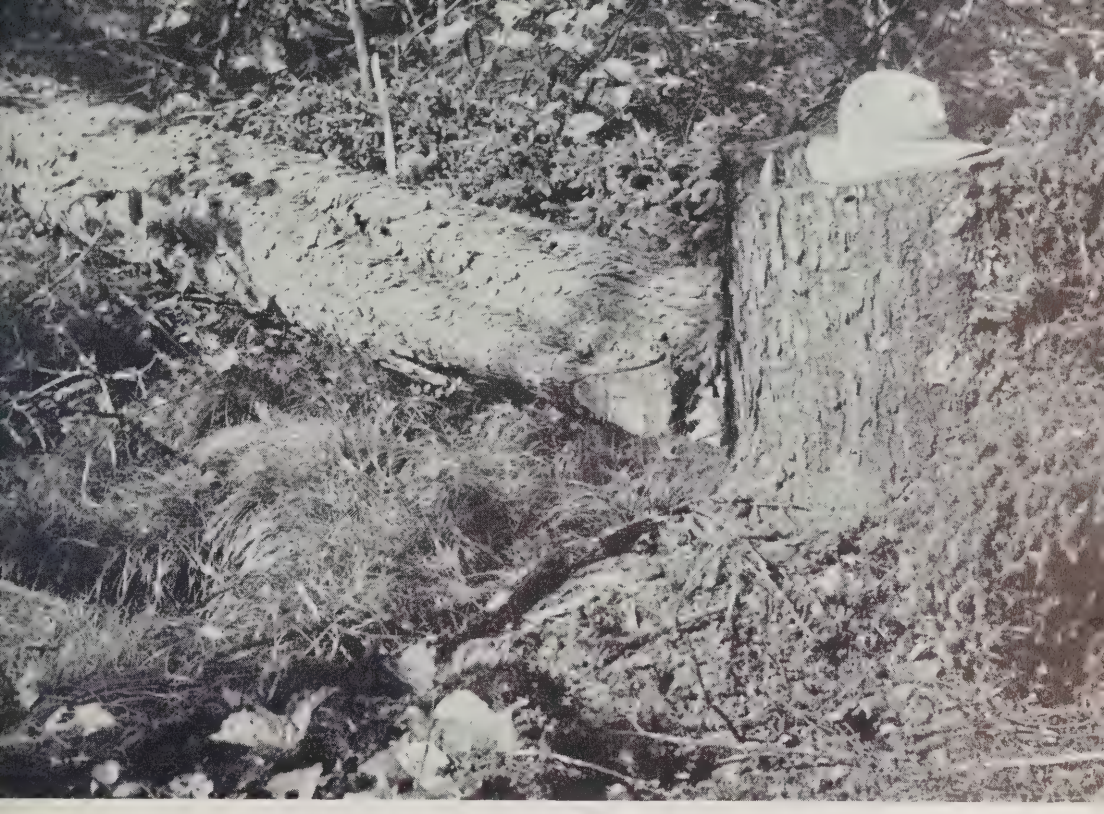
PULP AND PAPER INDUSTRY

In 1917, the total production of the pulp and paper industry was 873,043 tons. By 1941 this had reached a peak of 2,861,958 tons and in 1945 was 2,736,478 tons. The number of establishments reached a peak of 45 in 1926 but had dropped to 42 in 1946.

In 1920, Ontario was producing 33.4% of all pulp and 46.2% of all paper in Canada, but in 1944 the corresponding figures were 25.0% and 28.5%, indicating that production in other provinces has overcome the early lead established by the mills in Ontario. Development of a large export trade in pulpwood has undoubtedly had a share in this failure of Ontario to hold its dominant manufacturing position.

In 1920, the average output of pulp and paper per mill in Ontario was approximately the same as the average for the Dominion. By 1945, the combined output of pulp and paper per mill in Ontario was roughly 68,400 tons a year as against 91,400 tons for the Dominion. The average annual production per employee in Ontario mills was 234 tons compared to 249 tons for all the mills of the Dominion. Earnings of employees in Ontario averaged $2,051 compared to $2,012 for the Dominion. Wages per ton of production (pulp and paper mills combined) were $8.78 as against the national figure of $8.08.

The wood costs of Ontario mills are, on the average, higher than those of Quebec mills. To a limited extent this may be due to the heavy transportation charges on wood coming in from other provinces. A comparison of the cost of wood delivered at Ontario mills in 1945 with the cost of wood delivered at Quebec mills in the same year indicates a differential of more than $1.50 per cord in favour of that delivered to Quebec mills. In past years I have had good opportunities to observe operating conditions, particularly the factors of roughness of terrain, difficulties of providing forest roads, water storage and improvements,



Spruce butt 16 inches in diameter found under a brush heap where it was hidden because it was too heavy to handle. (Pulpwood exporting company operation.)

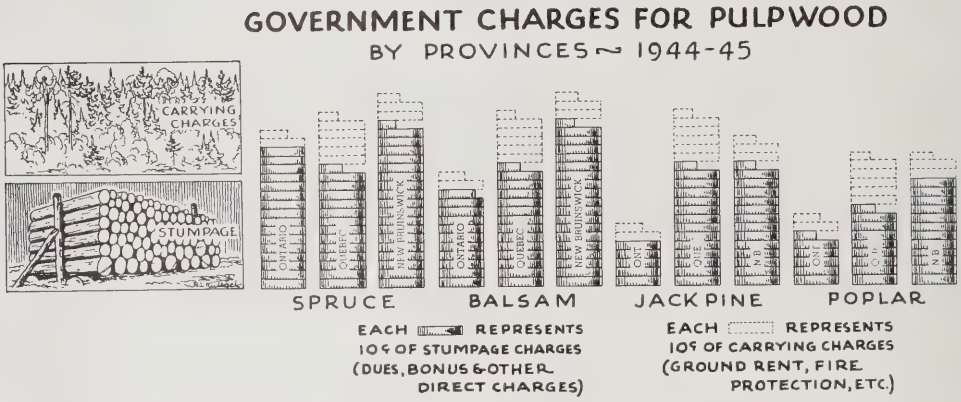
in all parts of Quebec. My past summer's study in Ontario's forests has convinced me that, in comparison, the average conditions are more favourable in Ontario. Ontario's wood should arrive at its mills more cheaply than wood produced in Quebec for her mills, and the Dominion Bureau of Statistics figures indicate that a differential in favour of Ontario of $1.10 per cord did, in fact, exist in the early 1930's.

In my opinion, the extra costs are due to the less efficient operating methods, resulting mainly from the piecework system widely used. This system of cutting wood in eight-foot bolts requires the clearing of strip-roads approximately 660 feet in length and 12 to 20 feet in width for each acre stripped. These roads are in addition to all main hauling roads and constitute, themselves, a most expensive item in production costs. Strip-roads parallel one another about 60 to 70 feet apart, so that the woodsman can carry logs to the piles beside them. Carrying logs 10-12 inches or more in diameter and 8 feet 4 inches long, in a worker's arms or on his shoulder, is most uneconomic and could in most cases be performed much more cheaply by mechanical power or by horses. With piecework workers earning well over $1.00 per hour, manual labour of this nature is difficult to justify. It is back-breaking labour for the individual; consequently many large bolts are buried out of sight under brush heaps because of their weight.

The clearing of the roads necessitates deep piles of brush between them, which seriously interfere with advance-reproduction growth.

On both silvicultural and humanitarian grounds, **I strongly recommend abandonment of the cutting of eight-foot pulpwood. If ground is too soft for mechnical equipment or horses, then I recommend that bolts be not longer than four feet, with narrower strip-roads more widely spaced.** Smaller areas may be left until frost has solidified the swamps.

Dues on balsam and jack pine pulpwood are much lower than in Quebec or New Brunswick. Those applying to spruce vary very widely but are, in general, comparable with those of Quebec, although lower than those applied in New Brunswick.



Comparison of costs of pulpwood stumpage in three eastern provinces for the season 1944-45.

Quebec charges the same dues on balsam and jack pine as on spruce, as the accompanying diagram shows, and the utilization of the first two is much higher in proportion to spruce than in Ontario.

The pulp and paper industry in Ontario has not advanced nearly as far as elsewhere in Canada in the utilization of species other than spruce. I believe this has been due to the relatively low carrying charges on limits, as well as the lack of a down-payment at the time they are leased; to the relatively low stumpage rates on spruce, which is undoubtedly the most desirable species from the standpoint of the pulp and paper maker (except in kraft mills where jack pine is preferred); and to the piecework system in general use which renders higher returns to the individual in the black-spruce-swamp stands where trees are of uniform size and rarely very large.

Dominion Bureau of Statistics data indicate that in the manufacture of groundwood, the ratio of jack pine to other species used in Quebec is more than two-and-a-half times that in Ontario.

Ontario will probably always have higher freight charges on pulp and paper than her neighbour, Quebec, but with her more favourable terrain and soil, and distribution of railways, she should be able to overcome the handicap of the freight differential.

I am firmly convinced that, particularly in the western portion of the Province, though not confined entirely to that region, forest operators generally do not build sufficient control dams to utilize the potential log-carrying capacity

of their streams. When dams are built, flooded areas are rarely cleared—except in isolated cases—but much boom timber is used to provide channels through the trees and debris which should have been removed. The cost and wasted effort of placing boom timber, with the added cost of driving logs under the circumstances, helps considerably in keeping Ontario's wood costs above those of Quebec. This is indicated by the annual quantities of boom timber cut, most of which is used for the purpose mentioned. For the past four years, the annual cut of boom timber has averaged 6,000,000 feet, equivalent to three to four hundred carloads of lumber.

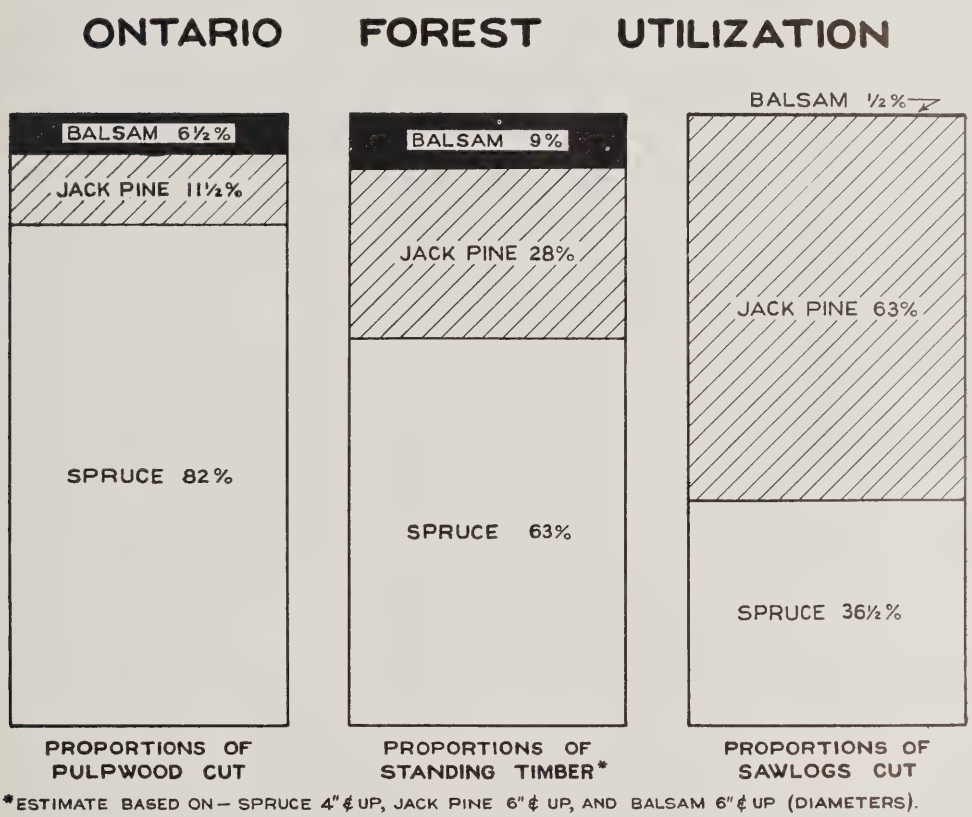


Diagram showing the proportions in which spruce, jack pine, and balsam occur in the forest compared with the proportions in which they are extracted for pulpwood and sawlogs.

During the period 1919-1929, Canada's total newsprint production increased by over 1,500,000 tons, with Ontario taking a very considerable portion of the increase. During the same period, the United States increased her newsprint production by only 40,000 tons. From 1926 onward, conversion of newsprint productive-capacity in the United States to other more profitable lines was actively pursued, while the cheaper and more highly competitive lines were left to the Canadian mills. This trend was particularly noticeable in the Lake States where, during the fourteen years ending 1935, the increase in the production of papers, other than newsprint, was 1,023,000 tons, while in the same period, newsprint production dropped by 137,000 tons.

The Lake States mills operate to a very considerable extent on Canadian wood, yet their products are "protected by tariff from low-cost producers, such as the Canadian and Scandinavian". The quotation is from a speech of Mr. A. R. Graustein, when President of the International Paper Company, giving the reason why United States mills had turned away from newsprint to other kinds of paper. In 1943, ten times more wood was imported into the Lake States than in 1919, compared with an increase of one-sixth in the consumption of their own home-grown wood.

Canadian fine-paper mills compete in Canada with paper made in the United States, possibly from wood exported from Canada. As evidence of this, I point to the fact that the first letterheads of this Commission, purchased on the open market in Toronto, were printed on United States bond paper. While I appreciate the complexity of tariff structures and know that they are matters for national, not provincial, negotiation or action, I believe that a joint study of the matter, with federal, provincial and industrial interests collaborating, might well prove of lasting benefit to the Canadian interests concerned.

I have found no instance of the use of sawmill slabs, trimmings and edgings in Ontario's pulp mills, though this is already the practice outside the Province. If sawmill slabs were collected and funnelled to pulp mills, the drain on limits would be eased to a considerable extent. I estimate the potential supply of pulpwood from this source at 65,000 cords of spruce and balsam, and upwards of 80,000 cords of jack pine. Not all of this can be economically delivered at the present time, but much of it could.

Some mills in Ontario have examined the possibilities of using poplar for pulpwood and its greater use for this purpose should be encouraged. Little development work has been done toward the utilization for pulpwood of hardwoods other than poplar, though the potential supplies of hardwood in Southern Ontario and the Algoma Region are tremendous.

Ontario mills are to be commended for pioneering in the development of by-products from sulphite liquor. They are leaders, amongst Canada's mills, in the installation of plants for the production of vanillin, plastics and industrial alcohol, and one plant also produces yeast.

In view of the cost and at times the uncertainty of coal supplies, it is remarkable that investigations have not been more actively and energetically pursued leading to the development of a fuel from waste liquor resulting from chemical pulps. This would be a fruitful field in which to seek economy because of central Canada's lack of coal and its dependence on the United States as its main source of fuel.

The almost complete divorce which exists between sawmills, on the one hand, and pulp and paper mills on the other, is costly and wasteful of both money and manpower. The final chapter of this report will suggest a remedy for this ill.

SAWMILLS

A completely different set of conditions from those applying to the pulp and paper industry affects timber markets and sales. In addition, the Canadian section of the lumber industry has never employed as many technically trained personnel, on either woods or sawmill operations, as the pulp and paper group.

The difference in the approach to woods and mill problems is probably because the sawmilling industry was active for nearly a century before the younger industry, and tradition has affected its actions to a much greater extent.

The lumber industry in Upper Canada commenced in a modest way in the first half of the last century, being then confined to the lower Ottawa Valley and a fringe along the front of Lakes Ontario and Erie. It expanded rapidly up the Ottawa and in the latter half of the century covered Southern Ontario and progressed up through the Parry Sound District, along the north shore of Lake Huron to Sault Ste. Marie. This rapid development was due in large part to the settlement and building up of the mid-western portion of the United States, with export from Eastern Ontario to the United Kingdom always a good sound backlog. Around the turn of the century, the vast Minnesota lumbering operations projected themselves across the border to the white pine and red pine forests west of the Great Lakes. From there they ate their way eastward toward the Great Lakes, on the lower stretches of which the larger units of the Canadian industry were even then closing for lack of timber.

Wherever the lumber industry has gone, the story has varied little. With the notable exception of a couple of the older firms in the Ottawa Valley who have continued in business for a century or more, few lumber organizations have ever lasted beyond a couple of generations. Methods then used were incredibly wasteful when viewed from today's standpoint and they generally brought devastation to the areas cut over, so that now only a handful remains of what were some of the most valuable pine forests on the continent.

Settlement invariably followed in the wake of lumber operations and the fires set by our ancesters in clearing land, much of which later experience indicates should never have been cleared, completed the ruin of the residual forests left after the white pine and red pine had been taken. The vast programme of reforestation and soil and stream rehabilitation, which is recommended in later chapters of this report, had its genesis in the operations of these pioneer lumbermen and settlers. To replace the forests then destroyed and to rehabilitate the soil is a long and costly process which must be undertaken by the grandchildren and great-grandchildren of those who benefited from the mistakes in the past. We must guard against handing on our remaining forests to our descendants in a similar condition.

There are a total of 1,147 sawmills of various sizes licensed in Ontario. This number varies from year to year and in addition there are some small mills which operate only a few days during the season and do not undergo the formality of obtaining a license.

The sawmill output in 1944 was 585,237,000 feet board measure, which is about one-third of the annual production in the early days of the century.

Mills have increased in number and decreased in size since the early days of the century, so that the average output per mill is very little more than one-quarter what it was then. At that, the average output per mill is about 20 per cent more than that of the remainder of Eastern Canada. (British Columbia conditions are not considered comparable.) Sawmill employees in Ontario produce about nine per cent less per man-day than the average for the remainder of the Eastern Provinces, but the product is worth 14 per cent more. The reason for lower production and higher value lies chiefly in the greater percentage of white pine and red pine in Ontario's cut.

This Province has not held its former place in the national picture. In 1908, Ontario produced 92 per cent as much lumber as all the other Canadian Provinces combined, excluding British Columbia. In 1944, the corresponding percentage was 31.4 per cent. If we are to have a balanced forest economy, this decline must be checked and the trend reversed.

A significant and healthy trend in sawmill production in Ontario has been the increased use of jack pine. Statistics for 1944 indicate 103,161,000 f.b.m. used. This was exceeded by only one species, white pine. I am convinced that the sawmill industry in Ontario, for several decades, will depend to an increasing extent on jack pine, with poplar usage also expanding to a degree not yet generally appreciated. White pine and red pine should again overtake and surpass the other species in utility in from forty to fifty years, if given the chance they deserve, including protection from cutting before they have reached economic maturity, a condition now seriously violated. For the present, we can only expect a downward curve of white pine and red pine production as the few remaining stands continue to be overcut in the effort to supply the demand for these very valuable species.

Jack pine has not received the favourable advertising its qualities justify. In strength and quality it is little, if at all, inferior to spruce, and in appearance I believe it surpasses that species. There appears to be a tendency, however, on the part of industry to be apologetic for its use, a tendency which must be eradicated. Poplar, too, is eminently suitable for a great many purposes for which the conifer species are now demanded. Operators in this Province, who are failing to utilize and sell these two species to their maximum possible capacity, are assisting in preparing an early grave for the unnecessary interment of their industry.

Spruce, birch and maple production has remained fairly constant during the past quarter century or more. They form the other major species cut in addition to white pine, red pine and jack pine. The sawing of poplar has not yet become a major element in our Provincial lumber production. A comparison of the average cut for five-year periods in three representative periods is worthy of note.

	Average for Five Years 1908-1912	Average for Five Years 1932-1936 (Depression)	Average for Five Years 1938-1942
All conifers	1,334,069 M f.b.m.	251,306 M f.b.m.	457,382 M f.b.m.
All hardwoods	152,084 "	52,390 "	93,714 "
	1,486,153 "	303,696 "	551,096 "

IMPORTS OF LUMBER

During the period 1928-1938, a bi-annual survey made gave evidence that Ontario was even then bringing in 150,000 M f.b.m. of lumber per annum more than was being shipped out. The survey was discontinued in 1938, but fragmentary data available indicate that imports have not lessened and that, if more abundant supplies from outside were available, the quantity would be considerably greater.

Because of Ontario's large population and high degree of industrial development, it consumes a great deal of lumber, but it does not produce nearly as much as it might or should. It is illogical that the Province of Ontario, possessing nearly two-fifths of all the accessible saw-timber east of the Rocky Mountains, does not meet its own requirements of lumber and must depend upon its neighbours for raw material for its industries. In the last year for which accurate statistics are available, only Prince Edward Island, Manitoba and Saskatchewan were further from meeting their own requirements of lumber than Ontario, and these three provinces combined have scarcely more than one-tenth of the saw-timber resources of Ontario. The fact that a considerable volume of lumber is shipped out of Ontario should not be permitted to cloud the issue. The cardinal fact is that the volume of lumber brought into the Province greatly exceeds the quantity shipped out. We shall probably continue to export a considerable volume of lumber, and we must of necessity import some species not native to this Province. But the net balance must be improved if a healthy condition is to be achieved. The present shortage of lumber in this Province is evidence of that need. Other provinces are not anxious to make up our lumber deficiency when other more lucrative markets are open, and we are unable to show any valid reason why they should. We have the demand for lumber, we have the necessary raw material to meet that demand, even more than meet it, but a basic weakness exists in the industry which converts the raw material into the product needed. It is felt that a re-orientation of Government policy could do much to maintain and develop the lumber industry in line with the needs of the people of this Province. Ontario's performance has no parallel in any other province, though its opportunities are as great. The decline in lumber production cannot be explained by suggesting that what we have lost in that industry we have more than made up in an expanded pulp and paper industry. This argument fails to convince because in other parts of the country, proportionately no more richly endowed with forests, the pulp and paper industry has expanded even faster than in Ontario, while at the same time lumber production has been maintained or increased, without apparently any greater damage to their forests. The reason is that in Ontario we lack a balanced policy with respect to our forest industries.

It is submitted that too many of Ontario's sawlogs are located on pulpwood concessions, both domestic and export. If the lumber industry is to continue to exist, these logs must be diverted to it, instead of being converted to pulp and paper for which smaller logs serve equally well.

It is true that many sawmill operators did not provide themselves with limits while they were available and are largely to blame for the situation in which they now find themselves. It is the citizens of Ontario, however, who will be the chief sufferers if we permit these improvident lumbermen to be eliminated by timber starvation. It is extremely doubtful if the forests of Quebec and New Brunswick, in addition to supplying their traditional markets in Great Britain and the Eastern Seaboard of the United States, can make up for the production of the Ontario mills, which will run out of local lumber during the next twenty-five years. In addition the threat of increased freight rates is even now upon us, and such increases would make the price of lumber supplied from outside the Province less attractive than at present.

Lumber for housing should be made as cheap and abundant as possible. Lumber also forms one of the largest single items of expense in the operation of our vast mining industry, which now uses about 70,000 M feet board measure

Logs intended for the manufacture of lumber. The diameters of the logs may be estimated by comparison with the hats in the foreground. Some of the smaller logs will yield the Province only two or three cents in stumpage and should have been scaled in cubic measure and used for making pulp.

Spruce up to 29 inches in diameter cut for pulpwood, but more suitable for sawlogs. The hat indicates the size of the logs. (Domestic company operation.)

per annum. These are but two of the many urgent needs for lumber stressed at public hearings of the Commission.

I therefore argue that we must maintain the lumber industry of Ontario, even though it means a changed viewpoint on the part of pulpwood operators. This should not be achieved by closing a majority of existing sawmills and opening up new ones which might be appendages of the pulp and paper industry. I believe that, in general, the continuity of present mills and their dependent communities should be assured and that Provincial interests will best be served by so doing, rather than by the development of new mills. Rescue of the lumber industry from its precarious position implies an obligation on its part to eliminate waste, both in woods and mills and to co-operate with the pulp and paper industry in providing pulpwood as a by-product.

A good reason for the continuance of existing units in the lumber trade is the complexity of the lumber market. There are several markets and uses into which the products of any log must be channelled. Any sudden shift in manufacturing and marketing processes might have far-reaching and detrimental results in the rather delicately balanced existing trade methods.

The wholesale trade co-ordinates the product of the hundreds of mills and fits it for market. It furnishes the real and, for many firms, the only sales service available to locate home markets and markets in the United States, Great Britain or elsewhere. Under present conditions this might not appear important, but under normal trade conditions it is most necessary.

The retail trade maintains establishments for further processing of lumber in all the major centres of population and performs a very vital service to the public. They funnel into the hands of the public the portion of sawmill output which the public can absorb. Acting in conjunction with manufacturers of secondary products, as well as with the export trade, they are a powerful influence in providing full utilization of that portion of the log which reaches the market.

Few people outside the trade realize that the effects of wartime controls are likely to persist even after the controls have been removed. Nobody should deny the necessity for drastic action in wartime, but I believe that the application of such measures implies an obligation to lend a hand, if necessary, toward remedying the trade dislocations so engendered. To illustrate my point, I quote the following example. In normal times, British Columbia fir was shipped to Eastern Canada for flooring, but wartime needs properly diverted it elsewhere. Eastern Canada's hardwood flooring producers had developed a creditable export trade which proved a godsend in depression years but, later, wartime output was necessarily channelled into the domestic field. With a return of normal trading conditions, British Columbia flooring will probably reappear as a competitor, but the export field may not easily be regained.

The lack of a sufficiently wide price range for the different grades and species of lumber has been the occasion of widespread complaint by operators across the Province. Although the subject was not stressed at public hearings, I am inclined to believe there is some justification for the contention that many dealers, with the knowledge of customers, invoiced their lumber as being several grades above the actual quality, in order to meet black market competition and achieve profits under the existing piecework rates. Certainly some smaller mills visited gave little thought to grading. The result of years of effort to establish proper

grading practices has largely been undone and, as a result, Canadian lumber will suffer in the export market.

Restrictions on exportation, the fixing of price ceilings, an income tax which, beyond a certain level of income approached confiscation, and other restrictive measures have all combined to discourage lumber production to a very grave extent, especially by the most responsible element in the trade. A spirit of patriotism can make the unworkable work in wartime, but such is not so today. This Commission has been told of instances of lumbermen actually curtailing their operations in the face of the present urgent demand for lumber. The reason given is a simple one. A large cut involves substantially more risk because of the greater inventory and greater capital outlay entailed, but under present conditions it offers the prospect of but little more net gain than does a small one, even if market conditions and prices should remain stable. Who, in these circumstances, would not follow the prudent course?

I am not an advocate of the immediate abandonment of all controls, indeed the matter of federal controls does not fall within the scope of this inquiry; but I believe I should draw attention to the wide discrepancy which exists between the apparent intent of certain federal regulations and the results they are achieving. By not doing so I should fail to show the provincial picture in its proper perspective. I believe that until this gap is closed and until the production of lumber on a large scale is restored as a reasonable risk, the best efforts of the Provincial Government to stimulate the manufacture of much-needed lumber can produce only very limited results for the time being. The stimulus should be given, however, and given without delay, as a necessary step in a long-term policy.

One of the most likely methods of increasing the profits of sawmills generally and at the same time lowering the cost of lumber to the public, lies in use being made of those parts of the logs now wasted. As an example of the need of closer utilization, an analysis of the Dominion Bureau of Statistics sawmill data for 1943 is presented below. Volumes have all been converted to cubic feet of solid wood.

RAW MATERIALS

	Volume		Value	
	Cubic feet	Per cent of total	Per cubic foot	Total
Logs and bolts used	134,000,000	100	$0.10	$13,526,633

PRODUCTS

	Volume		Value	
	Cubic feet	Per cent of total	Per cubic foot	Total
Lumber	45,500,000	34	$0.47	$21,261,613
Ties, shingles, pulpwood, etc.	7,500,000	5½	0.20	1,516,336
Secondary products and waste	81,000,000	60½	0.05	3,954,529
	134,000,000	100	0.20	26,732,478

As the cost of the raw material at the mill was roughly 10 cents per cubic foot, it is readily seen that three-fifths of the raw material handled was disposed of at half its cost. No clearer evidence could be found of the necessity for research aimed at the reduction of sawmill waste. It is possible that some operators may argue that the value of all secondary products and waste has not been reported, but another million dollars added to the values shown above would have no significant bearing on the conclusion reached.

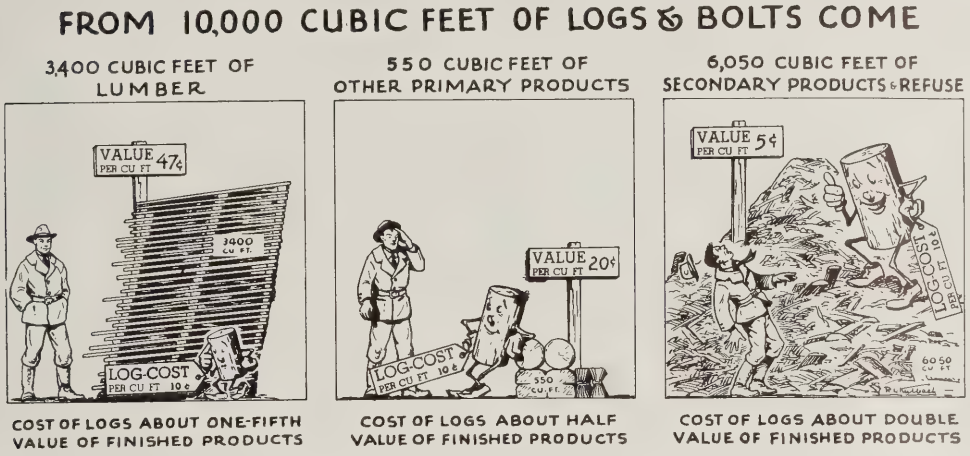


Chart indicating the unnecessarily high proportion of refuse and low-value products in the sawmill industry together with the comparative costs and values of the several classes of products.

During the past season I have measured the length of many logs on rollways and I have rarely found any log shorter than the measurement of its length class, plus the tolerance allowed. On the other hand, a large percentage of the logs measured were overlength, i.e. a nominal 16-foot log with an overlength tolerance of six inches would often measure 17 feet or more. In the sawmill system of Eastern Canada, this would be trimmed to 16 feet, a loss of six per cent on every board sawn from the log. This overlength tolerance should be closely watched by scalers and all logs exceeding it should be tallied in the next higher length-class.

Large improvements in the yield from sawmill operations are attainable by the operator who will study details of market needs and cut more closely to the sizes, specifications and grades to meet those needs. Stress has always been placed on quantity production of lumber in standard widths, lengths and thicknesses. There are a few operators in the Province who have discarded the traditional methods of operation and are receiving big benefits from studying the needs of special customers and integrating their operations with those needs. The end-product of any of the sawmill group who are similarly clear-sighed may equal or surpass the returns per cubic unit now made on all but the highest grades of pulp.

It is not at all unusual to see the slabs of a mill left to disintegrate or to be carted off as firewood, in spite of the fact that another mill is set up in the same area to produce box shooks, basket bottoms, etc., from the same type of material. A large box factory, surrounded by sawmills, cuts up into little pieces and utilizes top grade white pine and red pine, while the slabs of similar grades from the

other mills are shipped out as firewood or other low-income products. Poplar, balsam and jack pine, up to the present considered inferior species, could be made to supplant higher-priced species for many uses, at lower costs and higher returns to the producer than the species used. The co-operative collection and disposal of the low-grade material and waste of groups of mills offer a useful subject for study. A vast field for co-operation and integration in such matters remains virtually uncultivated.

I believe also that the day is upon us when sawmills should discard the practice of edging boards to even inches only, and trimming only to even feet of length. At what better time than in the present sellers' market could the trade get rid of this rather unnecessary waste which may range from 10 per cent to 20 per cent or more of the measurement of the board?

Before leaving this topic of industrial waste, however, I should perhaps say a word about waste in the pulp and paper industry, lest I leave the impression that only the lumber industry is guilty of incomplete utilization. The pulp and paper industry annually wastes thousands of cords of wood in the form of short ends of logs, slivers or unnecessary sawdust, all of which are used only as fuel to produce steam. Hundreds of tons of various substances are ejected into the sewers by chemical-pulp mills daily in forms which are capable of being converted into useful products such as sugar, yeast, alcohol, lime, acetic acid, etc., to say nothing of the products from lignin, a substance which forms a substantial part of wood and which is not generally utilized.

COMPARISON OF FOREST INDUSTRIES

The remarkable growth in the pulp and paper industry of Ontario and the simultaneous and almost equally remarkable decline in the lumber industry are depicted in the diagram opposite. Although, for convenience, production of lumber, pulp and paper is shown for only four years out of the past forty, the diagram is a fair representation of the long-term trends.

There has been a tendency to look upon the value of the end-product of the pulp and paper industry and that of the lumber industry as a reasonable comparison of their economic values to the Province. I am convinced that such a comparison misses many important features which radically affect the situation and which must not be neglected.

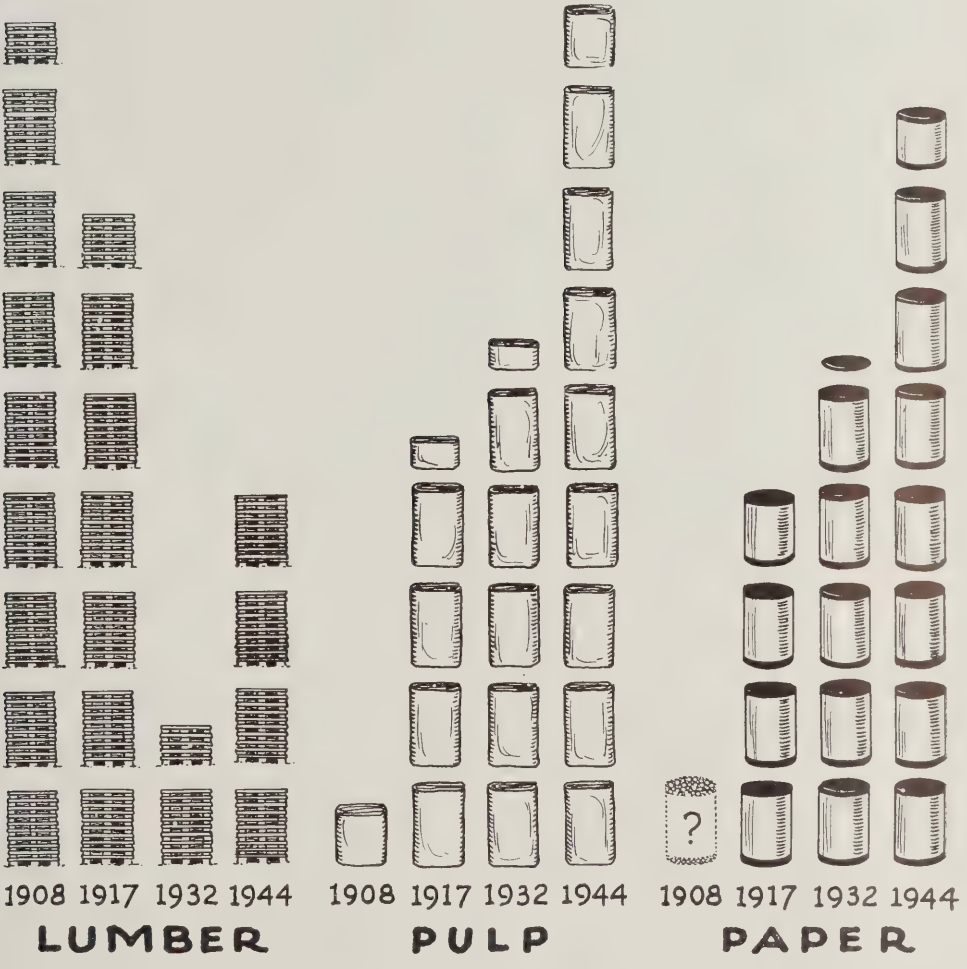
Analyzing the Dominion Bureau statistics for 1943 and converting wood volumes to cubic feet in all cases, the following figures emerge:

A cubic foot of wood used by the pulp and paper industry results in products worth 63 cents.

If converted to lumber, the figure is 20 cents, and if utilized by the wood-using industries (other than pulp and paper), 49 cents.

In practically all cases lumbermen pay higher ground rents and, in many cases, higher stumpage rates per cubic foot of wood of all species than is paid by the pulp and paper industries. (See curves on page 163). It is true that this fact has been beclouded for years by the Doyle rule, but it is a fact nonetheless. Some adjustment in this matter is overdue if all groups are to receive impartial treatment.

TRENDS IN ONTARIO PRODUCTION *of* LUMBER, PULP AND PAPER



EACH SYMBOL REPRESENTS 150,000 M.f.b.m. OF LUMBER OR 150,000 TONS OF PULP OR PAPER.

Trends in production of lumber, pulp and paper in Ontario since 1908.

In the same year, the wages and salaries paid per cubic foot of wood used by the various industries were as follows:

Pulp and paper	13 cents
Lumber	05 "
Wood-using industries	16 "

For each dollar received for the products, the industries paid out in wages:

Pulp and paper	20½ cents
Sawmills	26 "
Wood-using industries	32½ "

This latter tabulation modifies to some extent the idea that the end-product is all important. It may not appeal to those who believe that a dollar gained through the action of other dollars is more important than a dollar which reaches the pocket of the workman involved.

Pulp and paper mills tend to concentrate in areas where labour and power are available, but the personnel employed by and dependent upon the lumber industry is widely scattered in hundreds of small communities across the Province (see Map No. 11). This I believe to be beneficial as it is in direct opposition to so many other influences which tend to clog our towns and cities, leaving the hinterland without the supply centres necessary for their healthy development.

Lumber is now sadly needed in the repair and building of homes, for repairs to and the replacement of farm buildings, for railway ties, telephone and hydro poles, furniture, etc. **I therefore recommend that government policy be inclined in favour of the lumber industry, rather than against it, as would appear from stumpage rates, ground rents and limit allocations of the past decade.**

CHAPTER V

Crown Lands

ORIGIN OF CROWN LANDS SYSTEM

As indicated in Chapter I of this report, the establishment of Crown lands in Ontario had its origin in the needs of the Royal Navy, and during the early days of the Colony, all timber suitable for such needs was reserved for the Crown.

Lands necessary for agriculture, settlement, industry and recreation were alienated from the Crown, from time to time, as needs arose. The settler seeking land could obtain it in areas designated for settlement and after fulfilling certain obligations, such as the clearing of lands, the erection of buildings, etc., he could obtain title to his land by means of Letters Patent.

Until recent times, the Crown retained the rights to red pine and white pine on lands so patented, but legislation passed at the 1946 session of the Legislature allows the holder of lands with such reservations to obtain rights to the timber; free if he lives on the lot in question or within ten miles of it, and on very advantageous terms if it is situated more than ten miles from his domicile.

RIGHTS TO CUT TIMBER

Rights to cut timber on Crown lands fall under four headings:

(1) Licenses
(2) Agreements
(3) Permissions
(4) Permits

Forests already under license or agreement are indicated on Map No. 8. The number of unleased areas interspersed among the leased areas will be noticed on this map.

Licenses

Licenses are granted as the result of the sale of timber by auction. They are renewable yearly, provided the holder has complied with the laws and regulations relating to such operations.

Licenses granted prior to 1892 generally permitted the cutting of all species of timber on the area involved and stumpage rates applying to these licenses remain essentially the same as at the time the licenses were granted. The holders of such licenses have enjoyed very favourable stumpage rates over a long period of years. (In 1898 the right to cut species other than red pine and white pine was cancelled on limits within the boundaries of Algonquin Park, even though these licenses had been granted prior to 1892.)

Licenses granted since 1892 include only the specific species mentioned in the license. In addition to the "Crown Dues", as the earlier stumpage rates

were called, they normally provide for a "Bonus", and sometimes include a "Bid" above the bonus.

The practice of selling timber by auction has not always been to the best advantage of the individual or the Government. A very high bid places the license holder in a precarious position in times of low prices. His most likely course is to stop cutting the high-priced stumpage during depression times, causing unemployment and distress just at the time when employment is most needed.

Bidding for timber under licenses and permits has created a wide range of stumpage rates, as over optimism during boom periods or other causes (including a dog-in-the-manger attitude and ordinary spite) may motivate a bidder to offer rates which are not economically sound in normal times. It has been claimed that some companies wishing to dominate an area have made bids far above the possibility of normal economic utilization on species they did not require. The result was that, in some cases, the timber in question was denied to other operators and left a prey to fire and insects, with the Province losing employment and stumpage revenue. As an example of wide ranges, rates in this Province for red pine and white pine vary from $2.50 per thousand feet board measure, on old licenses in the Ottawa Valley, to $25.75 per thousand board feet on small areas in the Port Arthur District. Little, if any, of the material subject to the higher stumpage rates will be cut except during boom times.

A chart indicating the average rates in the various districts is shown on the next page and it will be noted that there are wide ranges for most of the species, with white pine and red pine showing the greatest variations.

Ground rent at $5.00 per square mile and fire protection charges at $6.40 per square mile are normally charged each year on the areas under license.

Agreements

This term applies to instruments granting Crown lands under contracts negotiated between the Government and individuals or corporations and large areas are usually involved, although there are areas as small as 30 square miles included in the group. Agreements cover a wide range of conditions, sometimes requiring the building of a new mill or the employment of specified numbers of men. Some agreements carry export rights for all or a portion of the wood on the area and some do not include rights to cut all species.

Fire protection charges are usually levied at $6.40 per square mile on the full area, or at least on a substantial portion, which is deemed to be the full area for the purpose of the contract. Ground rent on areas covered by agreements is levied at widely varying rates. It may be said, however, that the basic formula for fixing rates is that pulpwood consumed in Canada incurs no charge for ground rent, while pulpwood exported incurs a charge equivalent to $5.00 per square mile on that proportion of the limit area which the amount of wood exported bears to the total amount taken from the limit in any given year. There are many exceptions to this general rule, however, the most important one being the charging of ground rent at approximately 50 cents per square mile per year to those Canadian manufacturers of pulp and paper who have the right to cut all classes of timber on their limits.

In general, the contracts or agreements so written are a tribute to the bargaining capacity of the interests who have obtained the cutting rights. Whether

Diagram showing average crown revenue per thousand board feet (Doyle log-rule) for sawlogs by Forest Districts in the season 1945-46. Note the many marked inconsistencies.

or not they have proven or, in the final analysis, are likely to prove sound bargains on the part of the Province, will be discussed in the chapter dealing with Timber Management.

Permissions

This is a term applied to rights to cut timber from Crown lands in special cases where an agreement or license is not in effect. Permissions may be granted because negotiations leading up to a contract are under way but have not been completed. In some instances, substantial quantities of pulpwood are involved and the wood cut may be exported.

Permits

Permits are issued by District Offices for small quantities of timber where the stumpage value does not exceed $500, and may be issued by the District Office without reference to Head Office. Ground rents and fire protection, when applicable, are at the standard rates, $5.00 and $6.40 per square mile, respectively.

Areas of Crown lands operated under each of the above headings are as follows:

(1) Licenses	12,318	square miles
(2) Agreements	53,754	" "
(3) Permissions	4,012*	" "

The total area operated under the permit system is not great in comparison with the areas operated under other forms of tenure, because it is usually only one season's cut which is involved. Very frequently a permit does not define any precise area, but merely grants authority to remove a specified quantity of timber from a given locality. In addition to the areas specifically alienated under the above classifications, the Crown holds in reserve a total area of about 11,000 square miles. These lands are held in favour of certain pulp and paper companies which may, within a stipulated period, elect to add to their timber holdings. Meanwhile, these areas are withdrawn from possible use by others and return no revenue to the Crown, although the Province continues to pay the cost of protecting them from fire.

RELEASE OF LIMIT AREAS

In Ontario, the practice of cutting over an area held under license and turning the cut-over area back to the Crown has been widely practiced, particularly by the sawmilling group outside the Ottawa Valley. Many of the smaller sawmills across the Province are operating in the residual stands left by the larger units of the industry. The original holders exploited the choice stands on their licensed areas, but left the poorer stands. Then, without making any substantial payment, they could and did obtain other areas where a bigger profit could be realized by further high-grading of choice stands. This has occurred in all parts of the Province where lumbering operations have been carried out, with the exception mentioned above. Thousands of square miles of licensed area has been cut over and turned back to the Province.

*The total area operated under "permission" does not include those areas on which one operator has been given a permission to cut certain classes of timber on areas already covered by agreements with other operators.

In other timber-producing provinces of Eastern Canada, notably New Brunswick and Quebec, an individual or corporation cannot obtain limits without a substantial down-payment, and this practice would probably have been of great benefit if it had been adopted in Ontario.

For almost a quarter of a century, sales of timber in Quebec have required a down-payment never less than $400.00 per square mile, with an annual ground rent of $8.00 per square mile (reduced only for a few years in the early 1930's when ground rent was $3.00 or $5.00), in addition to the actual cost of fire protection (including half the cost of fire fighting). This latter item usually amounts to $8.00 to $12.00 per square mile per annum.

In Quebec, all species are included in the license, which is for one year only.

In New Brunswick, the down-payment to obtain limits has varied between $20.00 and $75.00 or more per square mile with ground rent at $8.00 per square mile, a bonus of $2.00 per square mile, and fire protection pegged at $3.20 per square mile (1/2 cent per acre). Licenses are normally for 30 years but a few large areas are under license for a 50-year period, and a large number of small licenses are for a 10-year period.

COMPARISON OF GOVERNMENT CHARGES FOR TIMBER AND TIMBERLANDS
(for operating season 1945-46)

	Ontario	Quebec	New Brunswick
Cost of acquisition of cutting rights per square mile	Nil	$400.00 and up	$20.00 and up
Ground rent per square mile average	$1.50[1]	$8.00	$10.00 (including 2.00 "bonus")
range	Nil—$5.00	(Single rate)	(Single rate)
Fire protection per square mile	$6.40	$11.50 (approx.)[1] (based on actual costs)	$3.20

STUMPAGE[2]
(Normal rates for sound "green" timber)

Species	Sawlogs per M. f.b.m. log scale[2]			Pulpwood per cord of unpeeled wood		
	Ontario[3]	Quebec[7]	New Brunswick[5]	Ontario[3]	Que.[4,7]	New Brunswick[5]
White pine—average	$4.20	$1.56	$5.45	....	....	....
range	2.50-25.75	....	....	....	....	....
Spruce —average	2.45	1.44	4.20	1.61	$1.35	$1.84
range	2.00-13.50	....	....	1.40-4.25	....	....
Balsam fir —average	2.05	1.44	4.30	1.02	1.35	1.84
range	2.00- 9.00[6]	....	....	.70-3.00	....	....
Jack pine —average	2.05	1.44	3.90	.48	1.35	1.35
range	2.50-13.25	....	....	.40-2.75	....	....
Poplar —average	1.60	1.20	2.60	.52	.85	1.20
range	1.55-10.00	....	....	.40-2.20	....	....

[1]Figure for 1944-45 (latest available).
[2]The comparison is based on the "International 1/4 inch" log rule applied to the average size of logs—each species separately—cut in Ontario. The stumpage rates are those prevailing in each of the provinces named translated into terms of the "International" log rule. The *ranges* of rates shown for Ontario are based on the "Doyle" rule.
[3]Figures for Ontario include "dues", "bonus", and "bid."
[4]Figures for Quebec include special levy of 10 cents per cord.
[5]The New Brunswick rates on all the species listed, except poplar, were increased considerably in the season 1946-47.
[6]Approximate.
[7]In Quebec, stumpage rates for sawlogs were increased (in effect) in 1946, and the rates for pulpwood were raised in 1947.

LANDS FOR AGRICULTURE, TOWNSITES, SUMMER RESORTS, ETC.

The Department of Lands and Forest handles all transactions concerning the granting or leasing of Crown lands for the purposes of agriculture, townsites, summer resorts, etc. There has been a noticeable improvement in the control of these transactions since 1941, when the late H. W. Crosby was placed in charge of the Division dealing with lands. To him must go a major share of the credit for eliminating, to a very considerable extent, the conditions which over the years have laid waste hundreds of thousands, if not millions, of acres of forest lands under the guise of assistance to settlement and to agriculture. In reality, the timber was mined from most of these lots, sold to domestic mills or exported, and the denuded lots allowed to revert to the Crown. Comparatively few of the lots in question were suitable for supporting agriculture because of the nature of the soil and climate, and the distance from markets.

The subject of classification of lands to prevent such wastage in the future is covered in Chapter XVIII.

REPRODUCTION

Up to the present, cutting practices on Crown lands in Ontario, as elsewhere in Eastern Canada, have been governed by considerations of current operating costs, rather than by the needs of a future crop of timber from the same area. Good reproduction, when it has occurred, has always created satisfaction, but it has been the child of chance rather than of design.

Pine in the Ottawa Valley and a majority, though not all, of the black-spruce-swamp types in the Province, give promise of future stands commensurate in quality and quantity to those cut. Other cut-over areas, on the average, are reproducing to inferior species or are barren or only partially stocked.

If Ontario is to remain one of Canada's major timber-producing provinces, this trend must be checked and practices developed and enforced which will guarantee a future crop preferably better than, but at least as good as, the one harvested, if such is economically feasible. Much research is needed in the methods of cutting the different species on different sites, before such methods assuring adequate reproduction can be recommended with a reasonable degree of certainty. Such research should not be delayed.

RECOMMENDATIONS ON CUTTING PRACTICES

I recommend the following cutting methods which may be enforced now and which will save much timber presently wasted:

(1) **No stumps over 12 inches in height to be tolerated. There is no adequate explanation to be given for high stumps. A stiff penalty (five cents per inch of excess height per foot of diameter or fraction thereof) shared by the operator and the cutter, would cure this wastage overnight.**

(2) **Large tops must not be permitted. A regulation requiring that on operations for sawlogs all trees be utilized to a top diameter of seven inches in conifers and nine inches in hardwoods, with limbs lopped to a diameter of four inches, would eliminate this widespread waste. On other forest operations, tops should not exceed four inches in diameter, with limbs lopped to three inches.**

Waste in pulpwood cutting. The most valuable parts of trees left in high stumps. (Domestic company operation.)

Waste in pulpwood cutting. The most valuable parts of trees left in high stumps. (Pulpwood-exporting company operation.)

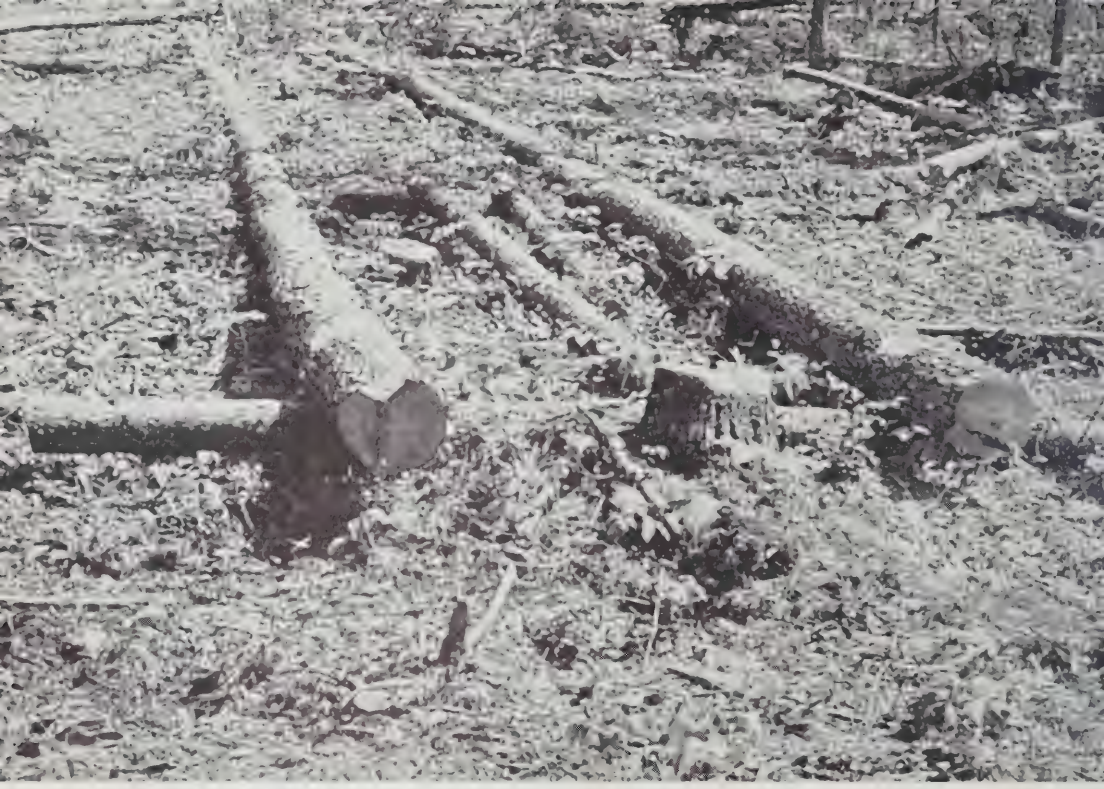
Waste in cutting sawlogs. The four stumps in this illustration are sound and measure 36 to 42 inches in height.

Brush should be spread close to the ground, to distribute the seed remaining in cones. A stiff penalty (five cents per inch of diameter), shared between operator and cutter and uniformly applied, would eliminate gross waste in tops.

(3) Further penalties, such as triple stumpage rates, should be provided and applied for all material felled but not delivered to piles or rollways for measurement. (I believe that company

Ten-inch jack-pine top wasted. (*Domestic pulp and paper company.*)

Tops left on a jack pine sawlog operation. Such wasted material would be excellent for making kraft paper.



Waste on a sawlog operation. Abandoned jack-pine skids measuring 10½ inches at the butts and 4½ inches at the tops.

Woods waste. Discarded red-pine skids, 50 to 60 feet long, two of which were 13 inches in diameter at the butt ends. (A domestic match-splint company.)

Bad utilization. A balsam top 10 inches in diameter, 20 feet long and a spruce top six inches in diameter, 16 feet long. (Pulpwood-exporting company operation.)

executives would be appalled if they realized the extent of lost effort and material from this source.)

(4) Where clear-cutting methods are permitted, merchantable trees of all species should be removed in a single operation, with suitable penalties such as double stumpage rates on trees which are left on areas cut over, unless they are undersize or are needed as seed trees. Otherwise, trees which are not wind-firm will blow down, mature trees will disappear before the next cutting and most of the remainder will die of sunscald when the surrounding trees have been removed.

(5) It is possible that a light initial cutting (30-40 per cent of the mature trees) should be made on some sites and of some species to open up the crown cover and permit seedlings to get established. This could be followed by a final cutting to remove the remainder as soon as the next crop is assured. In any event, the rule should be established that any area cut over must be left in a condition which promises a future crop of timber as good as that removed. Only in this manner will the joint responsibility of the operator and the Crown be discharged.

(6) When logs are placed in "rollways" or "skidways" they are piled on parallel poles known as skids, which often lie flat on the ground and are frozen in place when the logs are removed. On

sawlog operations, these skids are usually of pulpwood species which the operator has no right to cut. The practice of leaving skids often applies in the case of pulpwood cut in log lengths. Dead trees or poplar or white birch which are not usually removed from the forest, would serve equally well. The aggregate loss from skids left behind is tremendous and while some of it is measured and charged to the operator, the Province loses income from the further processing of the wood. I recommend that in future all skids of merchantable species be measured and charged to the operator. If they are not hauled out of the woods, double stumpage should be charged.

(7) In removing pulpwood, the lower layers of piles are sometimes left because they are frozen to the ground, and it would delay operations to loosen them. As hauling is done by piecework, they are left to rot and again the Province loses the extra revenue from processing. I recommend a penalty of double stumpage charges on all wood so left.

(see picture on page 22)

(8) Trees of all coniferous species in practically all parts of the Province, but particularly white and red pine in Eastern Ontario, are being cut before they reach maturity. The high prices paid by "black market" operators has recently accentuated this practice. Many of the trees so cut have just reached the stage where they are putting on their best growth and their cutting

Waste on a pulpwood, tie and log operation. Wood cut but not taken out of the woods. (Pulpwood-exporting company operation.)

Sawlogs were cut from the jack-pine stand on the right and much timber was left to die of sunscald and blowdown. On the left the same stand is uncut.

may be compared to slaughtering calves instead of full-grown beef animals. Drastic action is needed if the practice is to be curbed and, unless specifically authorized by the Minister or Deputy Minister, I recommend that cutting of the following species on Crown lands be forbidden under penalty, except as follows:

white pine—not less than 18 inches in diameter 12 inches above ground or 125 years old.
red pine —not less than 16 inches in diameter 12 inches above ground or 75 years old.
spruce —not less than 14 inches in diameter 12 inches above ground or 100 years old.
jack pine —not less than 12 inches in diameter 12 inches above ground or 70 years old.
balsam —not less than 10 inches in diameter 12 inches above ground or 60 years old.

FIRE PROTECTION

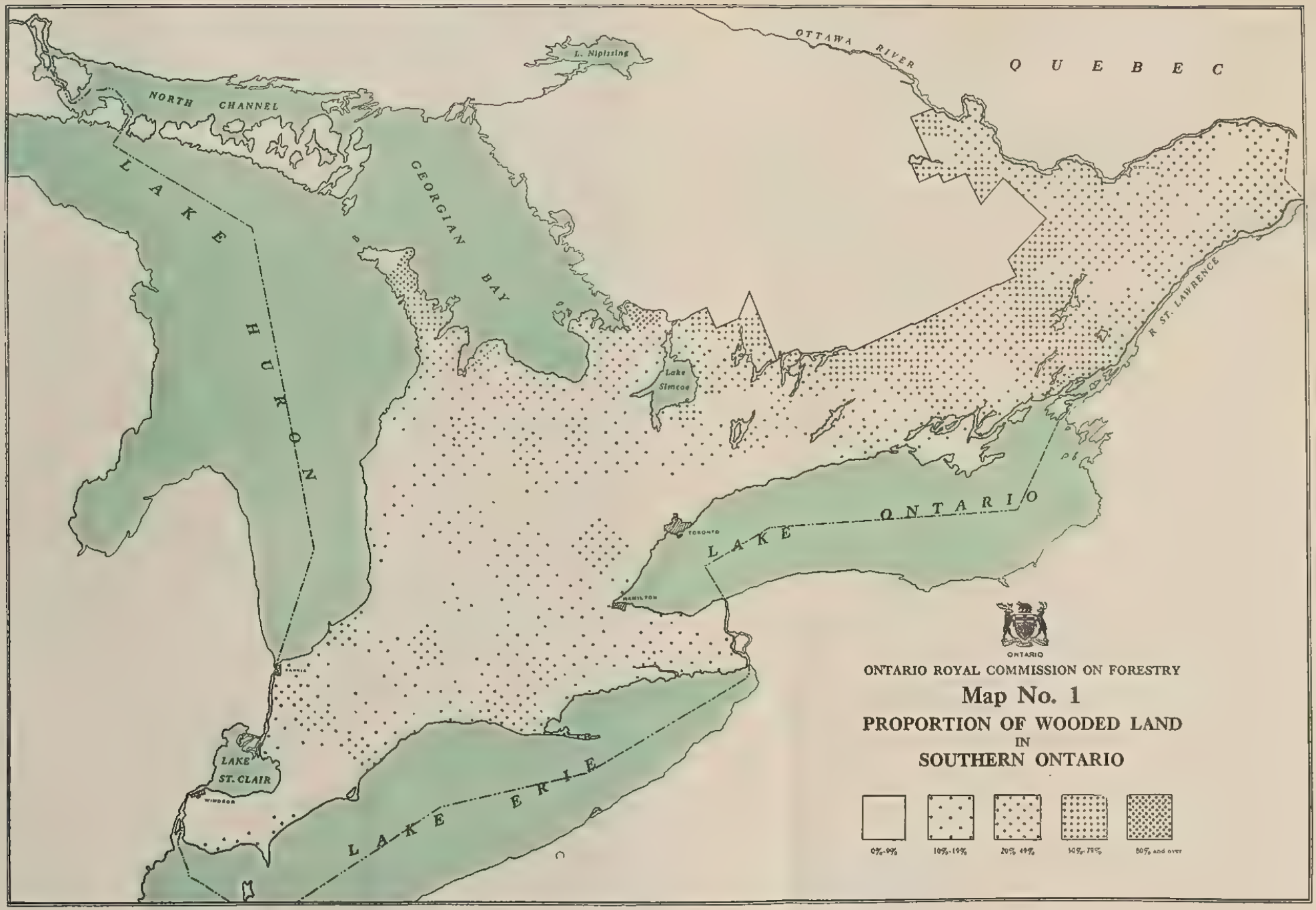
It has been noted that there is a tendency to minimize the disaster resulting from fires in cut-over areas and in young forests which do not yet carry timber which has reached merchantable size. I submit that this is an exceedingly harmful attitude to adopt, as these areas are the ones which should provide the timber for the next generation or two. It would be comparable to argue that a disaster causing many fatalities in a boys' school was not really serious economically as none of the boys had yet commenced work at his career.

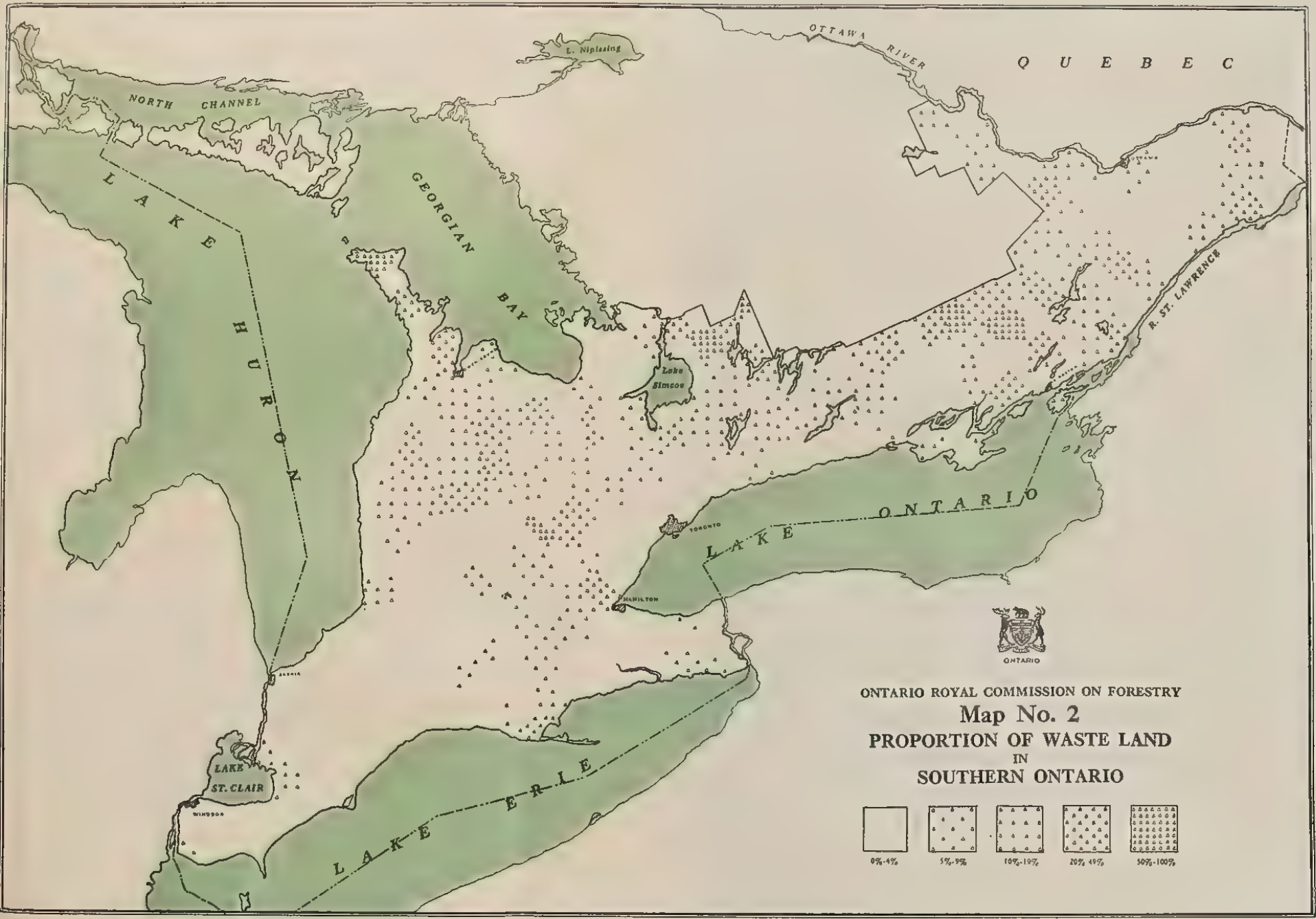
Fire in mature stands is at all times wasteful as regards present timber resources and every possible measure must be taken to prevent it, but fire in

slash following operations or in young stands not yet producing seed, is doubly disastrous as it normally leaves a barren. Fire in mature timber is usually followed by a good future crop; in fact, some of the best pulpwood stands in Ontario are the result of past fires in mature timber. Chapter X deals with fire protection.

DESCRIPTION OF LIMITS

Areas described in licenses and agreements sometimes overlap and in some instances conflict through the granting of similar rights on the same area to both types of limit holders. The descriptions of other limits are qute inadequate, making trespass easily possible and difficult to establish without survey. In many cases, areas are described but the limit lines have not been established. One license which lapsed in 1946 granted rights to cut a million board feet of lumber in Quetico Park but the area to be cut over was only roughly described and situated within a block of 48 square miles, carrying probably ten times the quantity of timber permitted to be cut under the license. The result can only be deplored.


L. Nipissing
OTTAWA RIVER
QUEBEC
NORTH CHANNEL
GEORGIAN BAY
LAKE HURON
Lake Simcoe
R ST. LAWRENCE
TORONTO
LAKE ONTARIO
HAMILTON
ONTARIO
ONTARIO ROYAL COMMISSION ON FORESTRY
Map No. 1
PROPORTION OF WOODED LAND
IN
SOUTHERN ONTARIO
LAKE ST. CLAIR
WINDSOR
LAKE ERIE
0%-9%
10%-19%
20%-49%
50%-79%
80% and over


L. Nipissing
OTTAWA RIVER
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LAKE HURON
GEORGIAN BAY
Lake Simcoe
R. ST. LAWRENCE
TORONTO
LAKE ONTARIO
HAMILTON
ONTARIO
LAKE ST. CLAIR
WINDSOR
LAKE ERIE
ONTARIO ROYAL COMMISSION ON FORESTRY
Map No. 2
PROPORTION OF WASTE LAND
IN
SOUTHERN ONTARIO
0%-4%
5%-9%
10%-19%
20%-49%
50%-100%

CHAPTER VI

Private Lands

AREA INCLUDED IN STUDY

In this chapter, a study is made of that part of Southern Ontario which lies outside the districts protected against fire by the Department of Lands and Forests. The counties or parts of counties involved are clearly indicated on Map No. 10.

Much privately owned land and many thousands of acres of woodlot, actual or potential, are located to the north and west of the area studied. Soil conditions, climate—particularly precipitation, existence of roads, communities, social amenities and local markets, however, manifest the greater importance of the area on Map No. 10 and the data in this chapter relate to it Many of the recommendations made are equally applicable to the more northerly part, but it must be realized that, on the basis of yield to the Province in social or economic benefits per dollar spent, the northerly part cannot compete with the area shown on the map.

The area covered, which includes some Crown lands, amounts to 34,600 square miles (22,121,000 acres), or about 10 per cent of the Province. A large proportion of the richest agricultural land of the Province lies within it.

FIELD SURVEY

The counties shown on the map were divided into three zones:

(1) Hastings County and eastward to the Quebec boundary;
(2) From Hastings County west to include the Lake Simcoe District;
(3) Huron and Erie Districts.

A forester from the Commission staff was assigned to each of these zones and he was conducted and guided by personnel of the staffs of the District Foresters. The Commissioner obtained an over-all picture of the existing situation by paying several visits to each of the three zones.

Examinations of many woodlots were made in every county, usually in company with the owner. County and township officials, officers of agricultural and conservation groups, and manufacturers of wood products were interviewed. Owing to the limited time available, the examinations were extensive rather than intensive, but they covered every major soil-type.

CHIEF PHYSIOGRAPHIC FEATURES

The chief physiographic features affecting forest types are as follows (see Map No. 3):

(1) Pre-cambrian Shield,
(2) Niagara Escarpment,

(3) Sandy Moraines and Plains,
(4) Limestone Plains,
(5) Morainic Hills,
(6) Drumlin Areas,
(7) Marshes and poorly drained lands.

(1) Pre-cambrian Shield

This extends around the northern border of the woodlot area and consists of granite and crystalline limestone. It is more suitable for the growing of trees than for agriculture. In the Tweed District, however, the Townships of Elzevir, Kaladar, Kennebec, Olden and Oso have recently been excluded from the fire-protection area and parcels of land are being sold to individuals, apparently for agricultural purposes. As this area has only scattered sections of marginal agricultural land, is poor in appearance and is traversed by Highway No. 7, it would be wiser for the Province to reverse the process, acquire more of these lands, return them to the forest-protection area and put them back to growing forests. It would be cheaper to buy the portions which do not belong to the Crown and which will naturally reforest themselves, than to purchase and plant similar areas elsewhere.

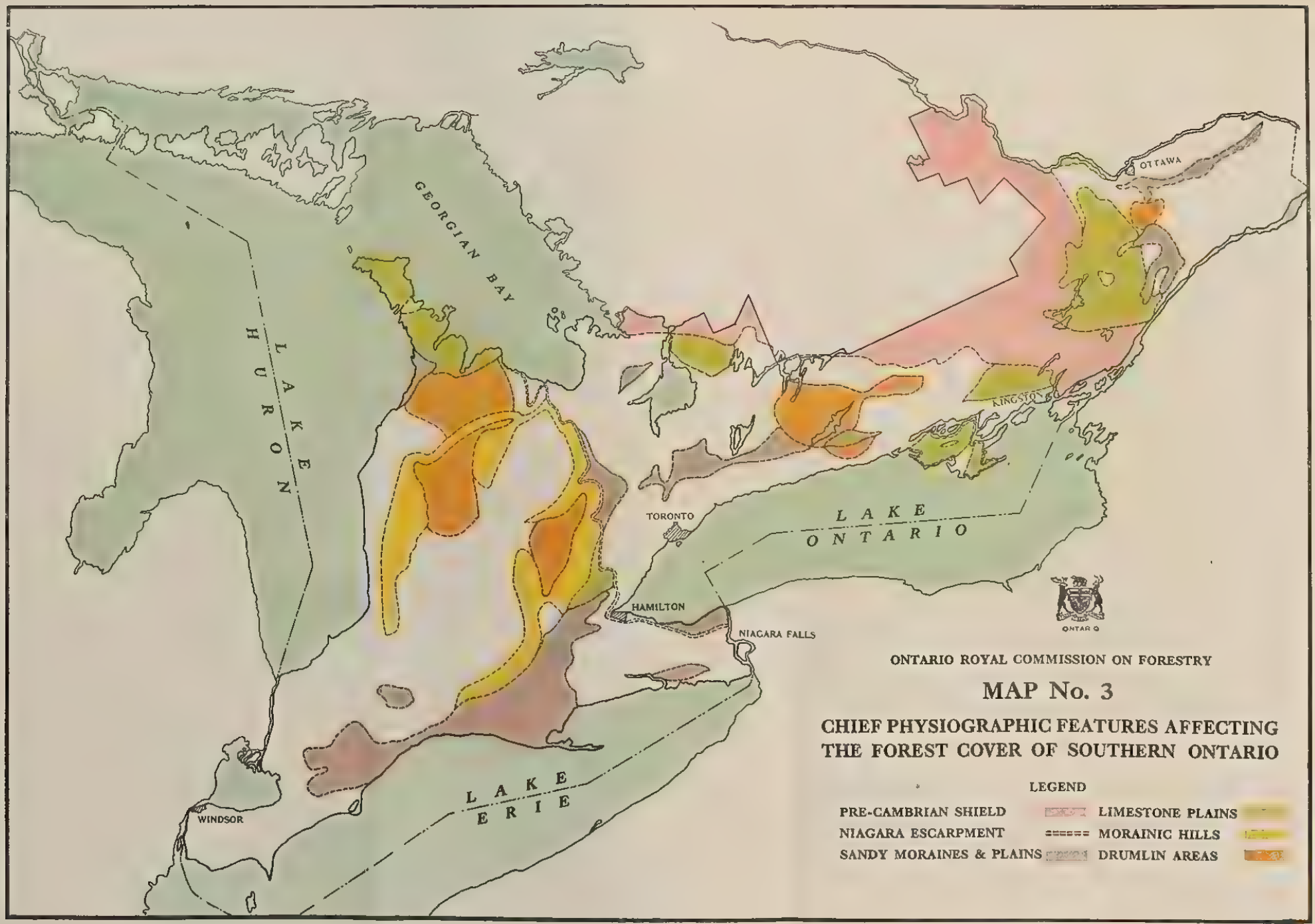
Hardwood forests, if given a chance, naturally reproduce themselves well and carry heavier stands in unit of wood per acre than conifer forests, but plantations of hardwoods to date have not generally been successful in this part of the American Continent. This is most important, as much recently cut-over land throughout the Province could be purchased and would return to hardwood forest by natural means more quickly than would areas which have to be planted. Furthermore, natural-reproduction costs per acre would be lower than the bare planting costs on areas which have to be so treated.

Forest fires were very prevalent in this area many years ago. The last one of serious consequence occurred in 1913, an indication of the tremendous strides made in fire protection since those early days. Although many barren and rocky hills are noticeable, much of the area is covered with a second growth stand 40-60 years old. At this age pine trees are just entering their period of best growth and as the tree increases in diameter, not only is volume increase per year tremendously accelerated, but the grade of lumber that may be sawn from it improves at an even faster rate. This fact has not been grasped, or is ignored, by almost all private landowners whose forests contain growing pine; and it would seem that, in their own and their childrens' interests, they should be protected from their folly.

Cutting of immature pine or other species is very widely practised and I believe it could be controlled through the licensing of sawmills. Provision of license cancellation for sawing undersize logs would quickly reduce the practice to negligible proportions.

(2) The Niagara Escarpment

This consists of a long series of steep slopes which extend from the Niagara River to Owen Sound. Much of it has been cleared for agriculture but it suffers badly from both erosion and drought. A programme of reforestation of denuded areas is necessary.


GEORGIAN BAY
LAKE HURON
OTTAWA
KINGSTON
TORONTO
LAKE ONTARIO
HAMILTON
NIAGARA FALLS
WINDSOR
LAKE ERIE
ONTARIO ROYAL COMMISSION ON FORESTRY
MAP No. 3
CHIEF PHYSIOGRAPHIC FEATURES AFFECTING THE FOREST COVER OF SOUTHERN ONTARIO
LEGEND
PRE-CAMBRIAN SHIELD
NIAGARA ESCARPMENT
SANDY MORAINES & PLAINS
LIMESTONE PLAINS
MORAINIC HILLS
DRUMLIN AREAS

(3) Sandy Moraines and Plains

These consist of the sand plains of Eastern Ontario, the glacial moraines of Central Ontario and the sand deltas of Western Ontario formed where the glaciers entered the lakes of the glacial era. Portions of these sandy moraines and plains have supported agriculture in the past, but many of the farms have already been abandoned because their occupants could not make a living from them and it appears that the rate of abandonment will be accelerated if and when present prices of farm commodities recede.

Much of the reforestation done in the Province has been confined to these areas and they contain most of the existing county forests. They form a fruitful field for the practice of forestry, particularly the growth of conifers. Mute evidence of the once splendid growth of pine that covered them still exists in the form of pine stumps several feet in diameter.

It is recommended that the main effort of any enhanced scheme of forest plantations be largely directed, in the earlier stages, to these areas, as such a course would prove extremely sound economically, in addition to conferring all the social and secondary benefits inherent in the growing of forests.

(4) Limestone Plains

Much of this land is now used for grazing cattle and this practice appears to be profitable. The situation should be closely watched, however, as tree growth does not appear to balance the mortality in the forested area due to grazing and cutting.

As the shade disappears, drought conditions are accentuated and, particularly in Lennox and Addington County, the thin soil covering over the limestone is disappearing. During dry spells, the animals' hooves powder the light soil covering and it is washed away with the first heavy rain. Reforestation of these areas, if attempted, will pose many problems yet unsolved and research should be undertaken to discover method and species best adapted to fulfill the needs.

(5) Morainic Hills

These hills, formed during the glacial period, occupy a horseshoe-shaped belt of rough and stony land in Western Ontario. Some good livestock farms are located in the area, but generally speaking the stony ground and the steeper slopes should be in forest if they are to be utilized for their optimum community value.

(6) Drumlin Areas

Areas of this type occur mainly in Grey, Bruce and Wellington Counties. The characteristic round-topped sand and gravel hills are also a product of the glacial period. They are admirably suited to the growth of trees and are of little value for any other purpose, yet both sides and tops have been cleared for agriculture, with serious erosion resulting in many instances.

(7) Marshes and Poorly Drained Areas

These areas are widely distributed in patches throughout Southern Ontario, with the more extensive ones in Dufferin, Peel and Grey Counties and in the

Poor land-use. Starvation pasture on thin soils over flat limestone. North of Napanee. Note stumps of large pine trees which once grew on this land.

Questionable land-use. Low-grade pasture on thin soils with limestone outcrops and glacial boulders. Near Roblin, Lennox and Addington County.

northern portions of Ontario and York Counties. Where these lands have been cleared they normally return to scrub willow and are utterly non-productive, although for the most part they naturally had a covering of cedar, tamarac, elm, ash and soft maple.

In any widespread effort of county or provincial reforestation, such land is not likely to be as productive of economic returns as better-drained sites. As little is known of how they may satisfactorily be returned to tree growth, **it is recommended that research be started here also as to method and species most suitable for reforesting such areas.** They form some of nature's most efficient water-holding agencies and therefore are extremely important in the maintenance of stream flow and water tables.

A tendency to overestimate the value of draining swamps and marshes has been indicated in the past and the practice is sometimes mooted for future land reclamation. Such schemes should be individually scrutinized and the best expert advice obtained as to their over-all effect. Marshes drained for the growing of onions in Western Ontario, in some instances, are subject to extremely destructive soil-drift. Unless wind-breaks are planted or restored, it seems possible that in another quarter century some of the present onion beds may develop into lakes during a considerable portion of the year. I have seen $3\frac{1}{2}$ cubic inches of soil obtained by melting a cubic foot of snow taken from a drift in the vicinity of an onion field.

It must not be supposed that the draining of all marshes is unwise. The Holland Marsh, for instance, is an example of the other extreme, where no water storage is involved and the land reclaimed is probably put to the highest land-use possible.

STATISTICAL INFORMATION AVAILABLE

There is a great lack of fundamental data on the woodlot problem in Southern Ontario because:

(a) Statistics available regarding areas and their values are compiled chiefly from reports of Township Assessors whose methods are not standardized, with the result that they are in many instances scarcely comparable.

(b) Woodlot owners generally do not know the volume or area of their forests nor the sales price obtained per unit of volume. Sales, when made, are usually on a lump-sum basis for the material on a woodlot or for a given number of logs of unspecified size. Most owners have no idea of the quantity or value of material cut for their own use.

(c) There is a lack of comprehensive data concerning types and values of products, numbers of people employed, wages paid, etc., for wood-working establishments and sawmills in any specific area of the Province. The source of raw materials for many of these establishments is known only to the owner and in many cases it is outside the Province or the Country, although the industry originally used local material.

(d) The vast majority of woodlot owners have no idea as to the location of a suitable market for much of their material, nor do they have any adequate knowledge of its value or how it should be measured. As a result, much high-value material is sold to local sawmills at a standard

price and utilized for inferior purposes, while plenty of high-grade material is used or sold as firewood. For instance, white ash, if sold for handles for tennis racquets or for station-wagon bodies, could easily return to the producer several times what he can get for it at the local sawmill or as firewood. The retention of Doyle rule as the official log scale of the Province has served to discourage many forest owners from placing their logs on the market; conversely, it has served to enrich many greedy buyers at the expense of the forest owner. A marketing section within the Department of Lands and Forests, which can be of service in these matters, will be discussed in a later portion of this chapter.

SHRINKAGE OF FOREST COVER

Assessment figures for 1943 indicate the woodland percentage of the various counties in the area included on Map No. 10 to be as follows:

	%		%
Essex	2.8	Elgin	8.2
Peel	3.9	Lambton	8.2
Wentworth	4.0	Prince Edward	8.4
Kent	4.4	Bruce	8.7
Brant	4.6	Grey	8.8
Durham	4.6	Haldimand	9.1
York	4.7	Simcoe	9.3
Wellington	5.1	Northumberland	9.3
Russell	5.1	Waterloo	9.7
Welland	5.5	Victoria	10.6
Dufferin	5.6	Grenville	12.5
Oxford	5.7	Norfolk	12.6
Lincoln	5.8	Carleton	13.5
Perth	5.9	Glengarry	15.4
Halton	5.9	Leeds	19.6
Huron	5.9	Frontenac	8.8*
Ontario	6.3	Peterborough	18.2*
Middlesex	6.4	Lennox and Addington	18.7*
Dundas	7.0	Hastings	20.4*
Prescott	7.3	Lanark	23.7*
Stormont	7.9	Renfrew	27.5*

*This percentage applies only to that part of the County outside the fire-protection area.

The total acreage of the territory under discussion, as mentioned before, is 22,121,000 acres. In 1901, the assessed acreage within this area was 18,827,100 (remainder Crown lands, etc.), of which 3,124,500 acres or 16.6 per cent was woodland.

In 1943, the assessed acreage was 19,131,400 with woodland shrunken to 1,848,100 acres or 9.7 per cent, a reduction of 41 per cent. For maintenance of water levels, prevention of erosion, soil drifting, etc., European authorities argue that not less than 20 per cent of the land surface should be under forest and in Germany, where land value was exceedingly high in pre-war years, 28 per cent of the land area was maintained under tree growth.

In Old Ontario, this percentage of forest cover has shrunk to 9.7 per cent and devastation of woodlots is proceeding at an accelerated pace due to continuing needs for large quantities of firewood from diminished forest areas and the unprecedented demand and high prices now paid for lumber, which in turn have given a tremendous impetus to the worst type of jobber, whose only thought is to cut the timber and realize on it while the boom market holds.

Various groups who have studied the question estimate that up to 8,000 square miles, or 5,120,000 acres of waste land in Old Ontario should be returned to forests. There are no accurate figures available but the Commission staff is convinced that at least 2,500,000 acres, and probably more, might profitably be reforested.

At this point it is emphasized that of the 1,848,100 acres of existing woodland (on 118,600 farms within the area studied), not more than 10 per cent could possibly be classified as *good* forest.

WOODLOTS

The present situation in Ontario with regard to woodlots is very unsatisfactory, due chiefly to the following:

(1) Owner's indifference and lack of knowledge.
(2) Cost of fencing.
(3) Assessments.
(4) Drainage schemes.
(5) Lack of marketing information.

Item No. 1—Owners' indifference and lack of knowledge.

Woodlot owners may be divided into two classes:

(a) A minority who are interested for various reasons, and
(b) The great majority who are not interested but who happen to have woodlots.

Most of the people interviewed were those in Class (a) above, because they were known to the District Foresters. Few owners maintain woodlots primarily to obtain revenue from them, but consider them a necessary source of supply of material for their own use, such as posts, fuel, maple syrup, etc., or that they serve the general community in maintaining water levels, preventing soil erosion, etc. These owners rarely cut a tree unless it shows signs of decay and are proud of this fact. Not one man interviewed took pride in producing high-quality trees, or managed his land for wood-crop production in the same way that he manages and plans his field crops. The vast majority of woodlot owners who are in Class (b) use the woodlot for pasturing cattle and gathering from it what fuelwood they may need.

How to convince this latter group of woodlot owners of the potentialities of their holdings under long-term planning is one of the most difficult problems awaiting solution. Many recommendations have been received concerning educational effort to this end in the schools, but the beneficial effect of such educational programmes will not be felt in a substantial way for some decades. These woodlot owners do not belong to agricultural or conservation clubs or societies where their problems may be discussed, nor do they read the excellent govern-

ment pamphlets which are available concerning woodlots. Few of them know that there are District and Zone Foresters located across the Province to advise and assist them, nor do they know of the beneficial legislation which has been enacted over the years regarding reforestation of their denuded lands and maintenance of existing forests.

There is urgent need for the inauguration of immediate restorative measures, as well as for the control of the exceedingly destructive methods practiced by so many operators who purchase and remove timber from Ontario's woodlots. In general, all species and all sizes are included in the purchase of such stands. The material suitable for sawing is usually removed first and the remainder is sold to a firewood dealer. If, as is usually the case, the lot is then used for pasture, the cycle of devastation is complete and instead of a forest which, wisely utilized, could continue to pay good dividends to its owner in perpetuity, there remain a few acres of indifferent pasture which will rarely yield a noticeable return.

As already stated, the ignorance and lack of interest on the part of landowners is a serious problem to be faced in developing a comprehensive plan of forest management in Southern Ontario. It is foolish to consider replanting millions of acres to forests unless the owners of the millions of acres already under forest are convinced of the necessity and economy of caring for them in such a manner that they will be perpetuated and improved. The trend until now had been toward deterioration and disappearance although, as mentioned earlier, it is cheaper and easier to maintain in production and improve an existing woodlot than to plant an equal area and tend it until its crop is ready to be cut.

Woodlot clear-cut for fuelwood. The soil is thin on partly exposed rock. Such land is unfit for agricultural crops or pasturage and will yield negligible revenue for forty years or more. Bruce County.

The public are inclined to criticize the methods of operation of Crown lands and their administration. I can truthfully say that the operations on Crown lands, now and in the past, have rarely exhibited any instances of such poor forestry methods, or so little thought or consideration of the future, as is to-day exhibited on more than 75 per cent of the farm woodlots throughout the Province. There is, it is true, a pitifully small minority of woodlot owners who manage their forests wisely and well and are reaping a rich harvest from them. I estimate this group to include less than two per cent of the woodlot owners.

Many who do not abuse their forests by using them as pastures, overcutting, etc., do not harvest them wisely for, as mentioned earlier, they cut only the trees which show signs of defect. This practice is equivalent to using only the defective apples from the barrel, with the result that one never gets a good apple. Trees should be cut when they have reached their prime and the space they occupy utilized for growing more trees. Defective and crooked trees should be removed and the healthy and straight ones allowed to benefit from the sun, rain and nourishment which will otherwise be wasted on the inferior members. Only in this way can a forest yield its best. There are forests in Europe which, after several hundred years of cutting, are as good as or better than the original stands. The practice of forestry refutes the adage that one cannot eat one's cake and have it.

The most widespread abuse of forests is that of utilizing them as pasturage for animals. If this practice alone could be eliminated, more than half the battle to save Ontario woodlots would be won. Forestry and pasturage cannot succeed on the same piece of ground, as diametrically opposite conditions are necessary for each.

Evidence has been given by competent authorities that an area of open pasture will maintain from six to twelve times the numbers of animals that can be maintained on a similar area of forest. Many farmers are deceived because a part of the area used as pasture is cleared and a part wooded. Most of the increase in size and weight of their animals is gained on the cleared portion of their pasture area, while the wooded portion is ruined by the destructive action of the cattle and furnishes them with little nourishment.

If one studies the ground surface in a well protected forest, it will be noted that there is a coating of humus, sometimes several inches in thickness, resulting from decaying leaves, twigs, bits of wood, etc. This is most important as it acts as a sponge to prevent the rapid movement of water and to hold it until it is absorbed into the ground while, in addition, it serves as a blanket so that the ground is frozen less deeply than in the open. The movement of trees by the wind ensures cracks in the soil which permit of deeper penetration of water, and the humus serves to keep these cracks from being clogged. Humus is also the habitat of most of the complex but necessary and beneficial insect and small animal life in the forests.

Where cattle are pastured, the humus is tramped down and can no longer fill the above functions. Tree roots become exposed and a prey to fungus diseases which result in dead tops and poor growth. At the same time, the saplings are denuded of leaves eaten by the animals and the seedlings are eaten or tramped down. A comparison of pastured and unpastured forest land is vividly portrayed in the accompanying pictures.

Pastured and unpastured woodlots. Note the thrifty young growth to the right of the fence and its absence on the grazed area. Grey County.

A well-stocked, all-aged woodlot with a good crop of seedlings typical of ungrazed stands. Grey County.

Item No. 2—Cost of fencing

The cost of fencing and its maintenance has been a big factor in the deterioration of the Ontario woodlot. It would be poor economy not to remove this factor, as the cost of fencing woodlot areas is much less than the cost of planting new forests. Many recommendations at the public hearings of the Royal Commission were for government or county assistance in fencing woodlots. **I recommend that the Province and the Counties share in a programme designed to provide half the cost of fencing the woodlots or repairing, to a proper standard, the woodlot fences of any property owner willing to enter an agreement with the Department of Lands and Forests. Such agreement should provide for proper care and perpetuation of existing forests or new plantations, and must carry the approval of the District Forester.**

Item No. 3—Assessments

Present legislation concerning assessment practices on forest land may easily result in discouragement of sound forestry. Assessments up to $50.00 per acre on woodlot areas is fairly common. In some instances, County Assessors are permitted to assess mature woodlands up to $75.00 per acre in Townships where the best farm lands are not assessed above $50.00 per acre. This is obviously taxing the crop on the land rather than the crop-producing value of the land, and does not take into account the fact that it has taken many decades to produce the forest, with high taxes in effect on it throughout the years.

The unsoundness of such taxing becomes most apparent if the owner decides to destroy his forest and to cash in on his forest crop. The same acres which were taxed so heavily may be sold to "cut-out and get-out" jobbers who remove everything but the small limbs and stumps, whereupon the owner can have his land re-assessed as "slash" land at rates as low as $2.00 per acre. This low assessment rate is also detrimental to the practice of forestry, as it permits typically forest land to be utilized for low-grade pasture or left in idleness or near-idleness when it should be kept under forests.

As a solution, it is recommended that an equalization of taxation rates be undertaken, with a reduction in taxes on lands already carrying good forests, and an increase on lands which are barren or near-barren but which are potential forest sites and would develop their highest economic and community utilization if retained for or returned to the growing of trees.

Justifiable assessment rates ranging, say, from $6.00 to $12.00 per acre, based on capacity to produce forests (some sites are better than others) would remove the unjust burden from the more highly taxed forest lands and place the levy on those lands which have been relegated to an inferior use because of the ignorance, short-sightedness or cupidity of the owners. The higher assessment on forest lands within the latter group would induce either reforestation or abandonment of the lands for non-payment of taxes; in the latter event, the municipality, county or Province could include them in a wider scheme.

There will be difficulty in overcoming the objection of municipal taxing agencies to the adjustment of their taxation structure, but without some such adjustment it is unlikely that in the near future there will be any significant action on the part of individuals toward utilization of typically forest-lands for the growing of forests.

It is also submitted that there is little of value in existing Statutes which permit municipalities to exempt from taxation up to 10 per cent of a farm, a portion of which has been divorced from pasturage and devoted to forest growth, either as a natural forest or as a plantation. It may readily be appreciated that such exemption, amounting usually to a couple of dollars per year (and rarely over five dollars) on lands already assessed at low value, is little inducement to an owner to plant and care for a forest which requires several decades before it commences to yield economic returns.

Bonus in lieu of tax exemption

Several recommendations have been made that a bonus be paid to any forest owner who, eliminating pasturage, will maintain his existing forest, or plant and care for a new one.

I consider that such recommendations are soundly based and have much merit as both the Province and the local community would gain from the enterprise of the individual earning the bonus. The community benefits are many: the countryside is beautified; water tables are improved; stream-flow is maintained and improved, and habitat provided for fish and wildlife, thereby enhancing the recreational value of the district. **I therefore recommend that the Province and the Counties jointly explore some method by which a yearly bonus of the nature recommended may be paid on young forest stands until they reach the production stage, provided they are cared for in a manner approved by the District Forester.**

Item No. 4—Drainage schemes

The drainage of agricultural lands has been the subject of Provincial Legislation over a long period but the schemes which have been carried out, particularly in recent years under the provisions of the Statutes from time to time in force, have proved most detrimental to woodlands in parts of the Province.

The principal Statutes now in force dealing with drainage matters are The Municipal Drainage Act, R.S.O. 1937, ch. 278, and The Ditches and Watercourses Act, R.S.O. 1937, ch. 350. These Statutes are merely the present day versions of the laws which have been in existence for many years. There have been amendments and changes in procedure but it is important to realize that the spirit and intent of the earliest Statutes have been preserved to the present time.

It must be conceded that in early days, drainage was necessary, if not vital for the cultivation of most of the farm lands in Ontario, and it was only natural that all drainage should be considered to be beneficial. The idea that the Province might some day suffer from lack of forests and swamplands was probably not even considered, and anyone who expressed such views would probably have been considered a visionary. However, it is rather surprising to find, under the vastly changed conditions of to-day, Statutes still in existence which encourage practices which have already ruined thousands of acres of our essential forest lands, which are causing widespread distress by the lowering of water tables and which give a mighty impetus to the erosion of our valuable agricultural soils.

The Municipal Drainage Act provides for the construction of large drainage works, quasi-public because of their extent and the number of landowners affected. Such schemes are initiated by petition to the Municipal Council who

may then have an engineer examine the area, prepare a report, plans, specifications and estimates and assess the costs against the lands to be benefitted. Upon the engineer's report being received, the Council may, by by-law, adopt the scheme and provide for the execution of the work. The cost in the first instance falls upon the municipality which may raise the amount required by an issue of debentures, and is eventually recovered from the owners assessed in the same manner as taxes.

The Ditches and Watercourses Act enables the owner of a small area of marshland, which in its original state may be fulfilling a valuable function, to force on his neighbours the construction of a ditch or drain which may be not only of no benefit to other owners, but even a positive detriment. The operation of this Act is limited to minor projects where the cost does not exceed $2,500 and the drain does not pass through more than seven township lots. The engineer appointed by the municipality to carry out the provisions of the Act has the responsibility for deciding if a proposed drain is required and it is he who decides, subject to appeal, what lands will be benefitted. If he determines that the drain is required, he makes an award providing for its construction and determines what portions of it are to be made by the different landowners.

While it is quite true that under both Statutes the expense is to fall only on the owners of lands which are benefitted, nevertheless the belief seems to persist, among those who are called upon to administer the law, that if land is drained, benefit must ensue. No consideration is given to the fact that the drain may imperil the life of forests along its course by the lowering of the water table, which leaves the shallow root system with insufficient moisture in dry seasons. No provision is made for compensation to owners whose lands are damaged, unless the damage has been occasioned by flooding, upon the assumption, apparently, that it is only this obvious kind of damage which is important.

Evidence was given by an engineer at London, Ontario, indicating that the cost of a drainage scheme carried out to provide an actual or presumed benefit of $500 to one individual, might easily cost up to $10,000 spread over a number of landowners and cause damage to woodlots, soil, wells and ponds exceeding that amount, and without any compensation being paid to landowners who must bear the loss.

Such projects normally follow lower ground where most of the remaining trees in the area are found. Modern ditching machinery and practice provide deep, wide, and straight ditches which will tend to speed up the flow of water to prevent silting and to reduce maintenance costs. Nature's method of preventing erosion is to have the streams meander across the landscape, lengthening the distance and thereby reducing the gradient from point to point. It will therefore be appreciated that drainage schemes normally reverse nature's methods by creating steeper gradients and faster currents which increase erosion. There are many instances where a return to nature's methods would appear to be in the general interests of the communities concerned.

Some drainage projects are necessary and beneficial. On the other hand, however, possibly the majority are ill-considered and unwise, with many of the land-owners concerned annoyed by and antagonistic to them. Some projects are obviously the children of ignorance and spite, and the original cost of the project frequently exceeds the value of the land reclaimed.

I recommend a complete and early review of The Municipal Drainage Act and The Ditches and Watercourses Act with the object of insuring:

(a) that no drainage project will be undertaken until its probable effect upon the community as a whole has been considered by a board of referees composed of judicial and engineering personnel, as well as practical farmers, and the approval of such board obtained;

(b) that no single landowner or small group of owners may be enabled to force an unwanted and even detrimental drainage scheme on neighbouring owners without their consultation and consent;

(c) that the costs of the work will be equitably distributed among the landowners actually benefitted;

(d) that provision is made for payment of compensation to those injuriously affected, and

(e) that Municipalites have power to expropriate areas which it is proposed to drain, when the welfare of the community requires that the area in question should be maintained in its existing state.

I believe that a revision of the above-mentioned acts in conformity with these recommendations should eliminate many complaints, which were drawn to the attention of the Commission and that few, if any, genuinely-needed drainage projects would be prejudiced thereby.

Item No. 5—Markets

A relatively quick solution of the present serious problem of woodlot devastation could be furnished by assisting woodlot owners to market their products. A ready, reliable, profitable and well-advertised outlet for the products of the average woodlot, regardless of the individual quantities or species produced, would engender in the minds of the great mass of owners an interest in the long-range possibilities of scientific forest management. No amount of propaganda, whether in the form of lectures, pamphlets or magazine or newspaper articles, will ever be as effective in convincing a farmer of the advantages in retaining, guarding and improving his young stands, as the knowledge that the trees which he is allowing his cattle to damage, or is tempted to sell to a jobber for a lump sum, will be three to ten times more valuable if directed to their proper market when they have reached their peak value. This knowledge would be most effectively driven home if he were to discover that, by delivering a truck load of a few mixed logs of yellow birch, white ash, oak, maple or hickory to a collection centre in his county, he would obtain $75 to $100 for them instead of the $20 to $30 yielded by cutting them into firewood or by selling his bush to a jobber.

Most farms have a woodlot. There are 1,848,000 acres of woodlot mostly on 118,000 farms in the area shown on Map No. 10. Relatively few woodlots to-day contain a large number of trees which may be sawn into logs of merchantable size, but most of them have some. Due to lack of knowledge on the part of farmers concerning location of markets, values, and the number of feet board measure which may be obtained from a log of a given size and length, most

of the potential supply of timber on Ontario's woodlots never gets into its proper economic channel. Even with this present unsatisfactory condition of farm woodlots, the standing timber of merchantable size presents a very imposing total. The annual harvest possible could even now largely provide for our domestic wood-using industries if it were diverted to them.

The extensive furniture industry which located in Western Ontario because of the hardwood forests originally growing there, now depends to a large extent on imports of hardwoods from outside the Province. Hickory and white ash for the handle industry come from the United States. The trees on which these and other industries were founded grew and may be grown again in the districts close to the factories. Sufficient material to permit the industries to live and expand is scattered across the Province on tens of thousands of woodlots. Some means must be found to funnel the material to collection centres from which it may be distributed to the industries which are in danger of starving from lack of it. Whether this may best be done by co-operative agencies or by a Crown corporation is a subject for study, and there need not be the same type of agency in all districts. Either agency could perform the service, and the function of the government would be to assist in organizing the proper flow of material where existing agencies are available and to provide facilities in areas where such do not exist. The government must also supply necessary advice as to cutting methods, what and when to cut, etc.

I recommend that the Government set up a Marketing Division within the Department of Lands and Forests and that the services rendered by the District and Zone Foresters be widely expanded.

Many woodlot owners who think they are very well served with regard to markets would be much surprised to find that in other localities, no more favourably placed, people receive twenty to thirty dollars more per thousand feet board measure for similar material. For example, species used for railway ties or car stakes, etc., can be diverted to higher value products such as handles, furniture, or flooring.

MAPLE PRODUCTS

Any discussion of woodlots in Southern Ontario should contain a reference to the maple-products industry. It is true it does not loom large in the economy of the Province, but it does contribute an appreciable part of the income of those who participate in it. Statistics indicate that from 1910 to 1940 the production of maple syrup dropped by more than 50 per cent (766,300 gallons to 359,900 gallons) while the drop in maple sugar production was even greater (251,100 pounds to 20,800 pounds). This is probably due to two main factors: disappearance of many of the sugar-bushes and a shortage of labour.

DEMONSTRATION WOODLOTS

Demonstration woodlots are located widely across the Province, but to date they have not accomplished results commensurate with their possibilities. Signs indicating demonstration woodlots have aroused interest and occasioned many inquiries directed to district personnel. Motorists and others, however, seem reluctant to stop and examine the woodlots and, as a result, little time or effort has been devoted to them for several years.

I am convinced that if the signs indicating woodlots gave more comprehensive information regarding what was being demonstrated, including rate of growth per acre, content or value at stated intervals, the date at which young stands will come into production, etc., many more people would stop and inspect the notices and the forests. It is not sufficient to put up a sign merely indicating the location of a demonstration forest.

FIRE PROTECTION

Fire protection is entirely inadequate in the areas adjacent to but outside those protected by the Department of Lands and Forests. Local municipal employees rarely have much knowledge of methods to be employed in fighting fire and, in any event, the necessary equipment is generally lacking.

I recommend that the Department of Lands and Forests be empowered to enter into agreements with adjacent municipalities to protect their forests at a fee commensurate with that paid by limit holders. I also recommend that the Department set up classes to train key fire-fighting personnel for those municipalities too remote from a protection area to justify their being included in it. All the heavily wooded municipalities should be urged to purchase and have on hand sufficient fire-fighting equipment to cope with a crisis when it arises.

It should be mentioned that the Fire Protection Service assists in detecting and fighting fire on private lands up to the capacity of equipment and personnel available, without depriving its own areas of essential services.

PRODUCTION POSSIBILITIES

A glimpse at the present and future possibilities of Ontario woodlots should probably be provided at this time. There is little authentic data applicable to existing conditions and we can only turn to statistics of older countries which have developed forestry practice over a period of centuries.

These sketches represent what is happening all too commonly in Ontario to-day. Many woodlots are used for grazing and most are in poor condition. Then they are clear-cut and the bulk of the wood is used for fuel with comparatively little going into sawlogs, pulpwood, or other relatively high-value products. Following cutting, little is left but waste and desolation.

In the mid 1920's, before Hitler had risen to prominence, Germany, with 31,268,500 acres of forest land, was cutting on the average about 48 cubic feet of stemwood per acre per year. This provided, amongst other products, some 200 board feet of lumber. Cuts varied between 28 cubic feet per acre on their more poorly managed stands, to 65 cubic feet on the better managed stands on

good soil, with corresponding outturns in lumber of 110 board feet and 300 board feet per acre per year plus other products. In addition, a large quantity of fuelwood was produced from limbs.

Present Possibilities

I estimate that Southern Ontario's woodlots could now produce wood on a scale comparable with Germany's poorer stands, or at least 25 cubic feet per acre per year, of which the quantity suitable for lumber would be at the rate of 60 board feet per acre. This is equivalent to a total annual production from all woodlots in the area under discussion of 110,000,000 feet board measure of lumber and some 300,000 cords of fuelwood and pulpwood, in addition to the fuelwood from limbs, thinnings and sawmill waste.

These sketches represent how the woodlot could and should be managed in the near future. First the cattle are fenced out. Then, when cutting is done, it is on a selective basis and as much wood as possible is made into veneer-logs, sawlogs, pulpwood, and other top-price products with only the refuse used for fuel. (The need for fuelwood could be met by drawing upon the forests north of the settled area which could well be used for this purpose for a time.) Finally, when the cutting is finished, a good residual stand is left to form the basis for the next crop.

Possibilities in 30 years

If sound silivicultural methods are developed and implemented, in thirty years' time we might expect to be able to make an annual cut of 36 cubic feet per acre including 100 board feet of lumber. This would be equal to 184,000,000 feet board measure of lumber and 370,000 cords of pulpwood and fuelwood, in addition to the by-products.

If the policy suggested in the previous set of sketches is carried out, the woodlots will be in a much healthier condition 30 years hence. The yield of good sawlogs and pulpwood will be increased and so too will be the supply of fuelwood, because more limbs and tops will be available for this purpose. If the cutting is done wisely, the quality of the residual stand and the new growth will be increasingly good.

Possibilities in 75 years

At the end of a rotation of, say, 75 years, the forests should have almost reached their maximum development and we could anticipate an annual cut of 48 cubic feet per acre per year, including 150 board feet of lumber. This would equal 276,000,000 board feet of lumber and 425,000 cords of pulpwood and fuelwood, plus other by-products.

In all these figures it must be kept in mind that a sawlog may be used as pulpwood and, if it is more profitable to do so, a considerable proportion of the material shown as lumber above may be diverted to use as pulpwood. Some of the material will be utilized as poles, ties, posts, etc., dependent upon markets.

After about 75 years of careful "farming", the woodlots of Ontario will be yielding their maximum crop of all products—a crop which should be twice as great per acre as it is at present. This could be maintained indefinitely as long as good forestry is practised.

The above figures and charts indicate reasonable possibilities which I believe will be far surpassed as soon as the landowners grasp the possibilities of forestry and allow potential forest lands, now wrongly used as pasture, to revert to their proper use. That the figures are not fantastic is certain, as there are already some of the best forests in the Province putting on growth approaching 100 cubic feet per acre per year.

PLANTING OF NEW FORESTS

The foregoing production possibility applies only to existing privately-owned woodlands. In addition, there are the millions of acres of wasteland which should be replanted. As mentioned on page 71, the Commission staff's minimum estimate of this area is 2,500,000 acres. (It is probably actually much higher, with estimates of various authorities up to 5,100,000 acres.) A large proportion of this area is better suited to conifer growth, though the heavy lands and moist areas should be devoted mainly to hardwoods. This area is much too great to be planted in a few years and **I recommend planting for the first ten years of 100,000 acres annually, commencing in five years' time, the remainder of the area to be planted in the ensuing ten-year period at the rate of 150,000 acres per annum.**

SEED COLLECTION

Any considerable increase in seedlings for planting cannot be expected before three to four years because problems of seed collection and extraction and nursery expansion are involved. Seed in storage is at present at a very low figure due to lack of labour for collection, and this will cause a very serious

Reforestation needed. Note the large pine stumps on the eroding, sandy hill. Near Rockland, Russell County.

A typical blow-sand area. Such land is not only unproductive but it becomes a menace to the surrounding country through sand drifting. It should be reforested.

Blow-sand has made this road unfit for use. Note the plantation on the right which is correcting this condition. Ontario County.

Erosion of clay land on the Lake Huron shore near Port Albert. The gully is about 70 feet deep at shore and extends about one-quarter mile inland.

bottleneck. **Seed collection should be expanded this year to produce about four times the annual quantity of conifer seeds gathered normally, with a less pronounced increase in the volume of hardwood seeds.** (Existing woodlots may be expected to produce hardwoods to an amount of three or four times the volume of their softwood output in the next 30 years.) Years in which seed is produced in abundance vary widely between the species, and in the pines and spruces usually occur at four- to seven-year intervals. Pests of one sort or another, insects, squirrels, etc., often ruin or steal most of the seed unless it is collected within a few days of ripening.

FREE DISTRIBUTION OF SEEDLINGS

Free distribution of trees to private land-owners commenced in 1905 with an output of 10,000 trees. This has increased to 8,000,000 trees for distribution last year. Unfortunately, a study of results indicates a high mortality amongst seedlings distributed to private individuals, particularly in the hardwood species. This is due to improper handling, poor planting and to unwise selection of species in relation to soils. Provincial nurseries could at present produce up to 23,000,000 seedlings annually, though total distribution of all species has averaged about 12,000,000 per annum for the past five years.

The planting of Scotch pine for Christmas trees has accelerated tremendously in recent years and the threat of over-production of Christmas trees would seem to be imminent. Here I should add that planting or cutting young conifers for Christmas trees is not bad forestry and it is not unpatriotic. It is a legitimate industry, usually representing good land-use, with high economic returns per acre. If the thinnings of conifer stands are utilized for this purpose, it can be considered good forestry. Incidentally, a tree which has sufficient branches and is the proper shape to become a desirable Christmas tree, is not likely to develop into a tree which will produce the higher quality of material needed for lumber, pulp, poles, etc.

GROWTH POSSIBILITIES FROM PLANTATIONS

If, commencing in five years, 2,500,000 acres of Southern Ontario are planted in the ensuing twenty years, economic returns from thinnings may be expected to be realized about 1985. These returns will grow progressively as the plantations mature until roughly 100 years from now, by which time all the plantations will have reached, or be reaching, maturity and we may expect a stand averaging 25,000 feet board measure, or over 50 cords, per acre.

The bulk of planting will probably be in red pine, jack pine and white spruce, with some white pine, so that an average rotation between 80 and 90 years should be ample. Even at 90 years this would permit an annual cut of 50 cubic feet per acre per year, or a total of 125,000,000 cubic feet per year. It is doubtful just what form of product markets will demand by that time, but that quantity would produce all of the following:

300,000,000 feet board measure of lumber,
750,000 cords of pulpwood,
500,000 ties,
125,000 poles.

Truly, in forestry one must think in terms of half centuries and centuries, and the countries with the vision and courage to do so will benefit from tremendous

returns. To those who think a century is too long to look ahead, I point out that Confederation is 80 years behind us.

In addition to the main benefits of increased production, there will follow all the other secondary benefits, such as control of stream-flow, maintenance of water tables, prevention of erosion, provision of proper environment for wild-life, and improvement in the recreational possibilities and aesthetic values of the Province. Some children now starting to school will live to see the culmination of such a scheme.

PROVINCIAL, COUNTY AND MUNICIPAL ASSISTANCE TO FORESTRY ON PRIVATE LANDS

The problem of reforestation of waste lands in Southern Ontario was apparent to many in the later years of the nineteenth century and this knowledge was crystallized into action in 1904 by the establishment of a lectureship in forestry at the Guelph Agricultural College. The Faculty of Forestry, University of Toronto, commenced to function in 1907 and the next step was the establishment of the Provincial Forest Station in Norfolk County in 1908.

In 1911, the Counties Reforestation Act was passed by which counties, and to a more limited extent townships, were enabled to purchase land and undertake forestry work under thirty-year agreements with the Province. At the last session of the Legislature, this Act was amended to extend to townships the main benefits of the legislation.

Broadly speaking, existing agreements provide that the county or municipality purchase the land and that the Province plant and care for the forests for a period of thirty years. At the expiration of this period, three options are presented to the county or municipality. They may:

(a) Repay to the Province, without interest, one half of the money expended in connection with planting, buildings, equipment, etc., less any income received, and share equally with the Province in future revenues, or

(b) Pay to the Province, without interest, all money expended in connection with planting, buildings, equipment, etc., less any income received, and take full possession, or

(c) Convey to the Province full title to the forest plantation, buildings, equipment, etc., on repayment, to the county or municipality, of the purchase price, without interest.

None of the counties availed itself of this exceedingly generous legislation until 1922 when Simcoe County purchased 1,000 acres of sub-marginal land which now forms part of the "Hendrie County Forest". The County Forests established under the Act, as well as those which do not come under the Act, are shown on Map No. 10.

On the whole, the County Forests seem to be well managed and thinnings are now being taken from some of the earlier ones in the form of pit-props and firewood. **It is recommended that the legislation now existing in regard to County Forests be amended and widened to include cities, towns, villages, individuals, estates and corporations.**

In some counties, if recreational and aesthetic values are to be restored and stream-flow, water tables and soil-erosion controlled, the areas to be reforested

are so extensive that the cost will be greater than the county revenues may be reasonably expected to bear. In such instances, where population is sparse and potential forest areas are large, probably the only effective approach to a large-scale reforestation programme is for the Province to purchase and plant the land, recouping itself for such expenditures from stumpage dues when the timber reaches maturity. Grey County probably comes within the above-mentioned category.

There are a number of school plantations throughout the Province. Some are well managed and others very badly managed, the care given to the plantation being generally in proportion to the interest displayed by the teacher.

School forests or plantations could serve a very useful purpose if carefully planned and supervised. Each pupil could look after part of a row of trees or a plot and prizes might be given for competitions to be judged by officials of the Department of Lands and Forests. Pupils should be taught to recognize species, count growth rings and take a general interest in the biological life of the forest. The Ontario Horticultural Association gives annual awards for school competitions and thereby performs a most commendable service.

The following Provincial Forest Stations are now operating or are under development:

Norfolk Provincial Forest Station (Norfolk County)—
Established 1908. Serving Southern Ontario Region.

Midhurst Provincial Forest Station (Simcoe County)—
Established 1922. Serving Lake Simcoe and Georgian Bay Region.

Orono Provincial Forest Station (Durham County)—
Established 1922. Serving Central Southern Ontario.

Kemptville Provincial Forest Station (Grenville County)—
Established 1945-46. (Now under development to serve Eastern Southern Ontario.)

Thunder Bay Provincial Forest Station—
Established 1945. Serving Northwestern Ontario.

BONUS PAYMENTS FOR PLANTATIONS

A few counties and townships have voted monies in aid of forestry activities by individuals. Prince Edward County voted $5,000 toward reforestation in that County. In Fredericksburg Township up to $4.00 per acre has been paid for tree planting, while in Camden, Lennox and Addington County, a landowner can collect for reforestation as much as $6.00 per acre on up to 10 acres. Of this sum, the County pays $2.00 and the Township $4.00. There is some diversity of opinion as to the value of this type of bonus, with claims that these plantations are not as well cared for or as indicative of continued interest on the part of the owners, as those which are the product of the owner's effort.

While reliable statistics are not available as to the area or quality of forest plantations resulting from seedlings supplied to individual landowners, undoubtedly several thousand acres are involved. Encouragement to owners to add to these plantations should not be overlooked.

CONSERVATION AND REFORESTATION ASSOCIATION

This is an association of the Conservation and Reforestation Committees of County Councils. The Association divides the Province into five zones in Southern Ontario and meetings are held in each zone once a year. It is an association whose work should be encouraged and expanded.

THE TREE CONSERVATION ACT

This Act passed in 1946 enables counties to pass by-laws regulating the size of trees that may be cut on private lands and, in general, ensures against any further denudation of already inadequate forest cover. Only eight counties have so far availed themselves of its provisions and it is yet too soon to assess the efficacy of the measures taken. It is difficult to enforce an enactment of this sort unless the general public support it. It is a step in the right direction, however, and with experience may prove to be exceedingly useful in curbing present abuses.

Many recommendations were made to the Commission that the Province, rather than the counties, should exercise such control. It was properly argued that many counties most in need of this type of legislation would hesitate to enact it because of the unpopularity of any measure aimed at controlling the action of an individual on his own property. It was even stated that in some counties a council which passed such a by-law would have no hope of re-election, and that therefore the Province should act.

I am convinced that regulation of the material to be cut in private forests is more necessary here than it is in the Scandinavian countries, where it is the rule. As the community suffers through the destruction of a forest, it may properly be argued that they should have some control over its maintenance. We have many laws already on the Statute Books, such as those concerning noxious weeds, which limit the freedom of the individual in the use of his land. I therefore feel that regulations covering the trees he may cut would not establish any new principle.

I recommend that, as soon as district forest personnel is available in sufficient numbers to supervise such a scheme, provincial legislation be enacted controlling the cutting of trees on private lands.

I maintain that a diameter-limit is not an adequate solution of the problem and never can be. Many trees should be removed as thinnings or because they are crooked or otherwise defective, even though they are below any diameter-limit which might reasonably be set, and the forest would benefit by their removal. On the other hand, a diameter-limit suitable for one species may be entirely unsound for another and might permit the removal of some trees which have barely reached their best growing years.

The trees to be cut should be marked by trained personnel. This is probably the only safe and sensible approach to managed forestry and its application will result in sound economy. It will be five or more years before we can hope to have sufficient trained forest personnel to carry out such a scheme on anything more than an experimental basis.

I feel it my duty at this time to pay tribute to the splendid work that has been done by the pioneers of forestry on private lands within the Province. Headed by Mr. E. J. Zavitz, who was the first and for years the only forester to

devote full time to this work, this totally inadequate group of scientists has battled for years against apathy on the part of the public and the consequent lack of funds and personnel necessary to develop a programme which the situation demands. A sound foundation now exists in the nucleus of a staff. Their zeal and courage in remaining in their chosen field, despite obstacles and discouragements which might easily have daunted lesser spirits, have resulted in the introduction of legislation and the establishment of nurseries which have encouraged and facilitated forestry.

ADMINISTRATION

For administrative purposes, the woodlot area of Southern Ontario is divided into six districts, each headed by a District Forester. In some of the larger districts, they have the assistance of Zone Foresters.

The fusion of the administration of Fish and Wildlife activities with those of the Department of Lands and Forests has added a tremendous amount of administrative detail to the work of the District Forester, particularly in the issuance of permits and in accounting. His greatest value lies in field contacts, spreading the gospel of forestry amongst the landowners in his district, and any administrative work which prevents such contacts is difficult to justify.

The amalgamation of the two departments is admirable and practical, but if the cause of forestry on private lands is not to be seriously hampered as a consequence, the District Offices will require additional staff to assist in administrative duties.

The present set-up is as follows:

District	District Forester	Headquarters	Zone Foresters
Erie	F. S. Newman	St. Williams	H. Zavitz
Huron	I. C. Marritt	Galt	W. Thurston J. C. Jackson
Lake Simcoe	J. F. L. Simmons	Maple	
Trent	A. B. Wheatley	Lindsay	
Tweed	A. Crealock W. W. Tweed, Asst. Dist. Forester	Tweed	W. E. Edwards
Rideau	W. E. Steele	Kemptville	

The District Foresters are assisted by specialists of the different divisions of the Department of Lands and Forests.

Four forest nurseries are located in Southern Ontario, and one in Western Ontario, as follows:

St. Williams
Midhurst
Orono
Kemptville
Port Arthur

I am assured that the efficiency of the nurseries could be improved and costs lowered if they were to be mechanized to a greater degree. United States nurseries now use seeders, transplanters, lifters and tree-planters. In Ontario, the lack of assistants to nursery superintendents is noticeable.

A seed-extraction plant under the direction of Mr. R. S. Carman is located at Angus, Ontario.

The personnel at present administering forestry on private lands can only serve as a nucleus of the staff required for the tremendously expanded programme which is foreseen if adequate measures are to be taken to restore the minimum forest-cover necessary. One trained forest-engineer for each two counties is the minimum technical staff required, and some of the larger and more heavily wooded counties, such as Haliburton, will require the full-time services of a forester. In addition, each forest engineer will require four to six trained Zone Foresters to assist in marking trees, in helping landowners harvest their forest crop properly, and in inspection work generally.

CONSERVATION AUTHORITIES

Under The Conservation Authorities Act of 1946, municipalities may group themselves together to undertake schemes of conservation, restoration and development of natural resources, or for the control of water to prevent floods and pollution, or for similar worthy purposes. One or more watersheds may be covered by such an Authority.

Upon agreement being reached by the municipalities participating in any such scheme, the Lieutenant-Governor-in-Council may establish the Authority, designating the participating municipalities and the area included.

An Authority, properly established, has power to conduct engineering studies, purchase or erect structures, acquire land through expropriation or otherwise, plant forests and assess the costs of its activities on the participating municipalities which, in turn, may issue debentures or otherwise raise the money. Grants to Authorities may be made by the Lieutenant-Governor-in-Council.

Under the Act, three such Authorities have been granted but the plans are not yet approved. They are as follows:

Ganaraska Watershed—Plan submitted to the Department.
Etobicoke Watershed—Survey has been made.
Au Sable Watershed—Survey not yet made.

The following four other watersheds are under study:

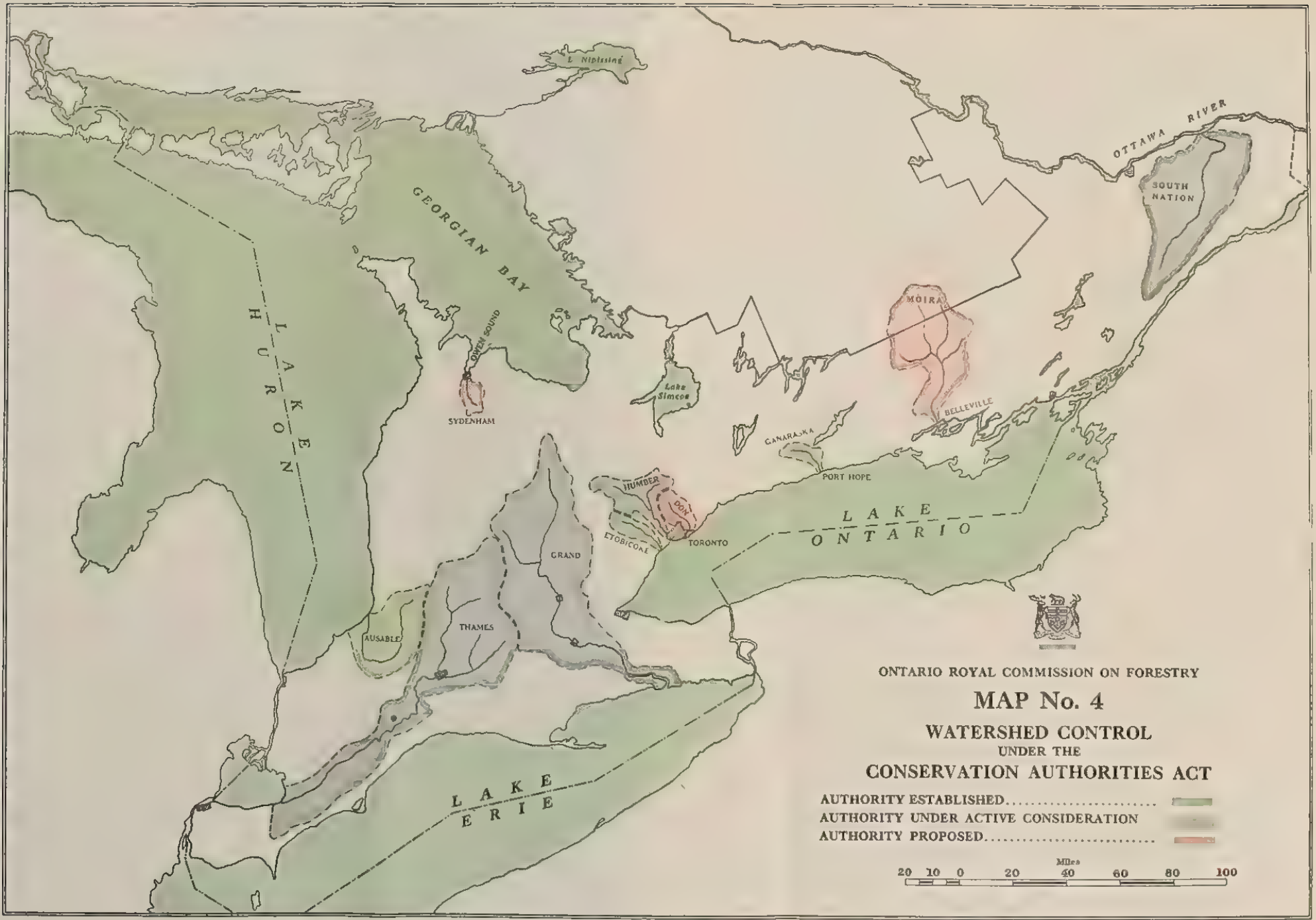
Thames Watershed—Survey has been made.
Grand River
Humber River
South Nation River

It has been proposed that the following watersheds be investigated:

Moira River
Don River
Sydenham River

(See Map No. 4 concerning Conservation Authorities.)

The developments by any or all of the above Authorities dovetail perfectly into any major project of reforestation in Southern Ontario. It is desirable that such schemes be fostered by the Government, as much of the Province's waste forest-land occurs on the watersheds of these streams. The waste areas mentioned elsewhere in this chapter include the areas under the proposed Authorities and,


L. Nipissing
GEORGIAN BAY
OTTAWA RIVER
SOUTH NATION
MOIRA
OWEN SOUND
SYDENHAM
Lake Simcoe
BELLEVILLE
GANARASKA
PORT HOPE
HURON
LAKE
HUMBER
DON
ETOBICOKE
TORONTO
LAKE
ONTARIO
GRAND
AUSABLE
THAMES
LAKE
ERIE
ONTARIO ROYAL COMMISSION ON FORESTRY
MAP No. 4
WATERSHED CONTROL
UNDER THE
CONSERVATION AUTHORITIES ACT
AUTHORITY ESTABLISHED.....
AUTHORITY UNDER ACTIVE CONSIDERATION
AUTHORITY PROPOSED.....
Miles
20 10 0 20 40 60 80 100

for the purpose of this report, money spent in reforestation in the latter may be considered as part of the general expenditures for forest restoration throughout the Province. Every precaution should be taken that these schemes of conservation do not overshadow the necessity for forest plantations and culture in other equally devastated areas.

The Act is administered by the Department of Planning and Development, but the Department of Municipal Affairs and the Department of Lands and Forests are both vitally interested.

FINANCE

Earlier in this chapter it has been recommended that Provincial funds might profitably be expended on forestry on private lands for:

(1) Purchase of lands in townships such as Elzevir, Kaladar, Kennebec, Olden, Oso, etc., to prevent their further devastation.
(2) Expanded research activity as to methods of planting, and species most likely to succeed in swamps and on limestone plains, etc.
(3) Assistance in fencing of woodlots.
(4) Yearly bonus to be paid on young forests until they reach the productive stage.
(5) Increase in seed collection and handling.
(6) Increase in nursery production and free distribution of seedlings.
(7) Expanded programme of county, municipal and individual agreements re forest plantations.
(8) Increase in administrative personnel (District and Zone Foresters and Rangers).

Financing of the above proposals will require a very considerable sum of money during the coming quarter century, particularly if the restoration of denuded areas is undertaken on a scale commensurate with the needs. Most of the proposals would be of a self-liquidating nature and should be considered long-term investments, rather than expenditures.

Reforestation now costs over $300,000 annually, including seed collection and preparation, operation of nurseries capable of producing something over 20,000,000 seedlings, and all maintenance and development work in connection with county, municipal and individual plantations.

I estimate that, in view of the increased personnel needed to carry on the contacts with landowners, in addition to expansion of nursery staff, seed collectors and administrative personnel generally, the new cost of reforestation might be seven times the old figure, or $2,100,000. The other new services contemplated in addition would vary from year to year, but a fair annual estimate would be:

Purchase of land	$100,000
Fencing assistance	15,000
Bonus for planting and maintenance	50,000
Research	25,000
	$190,000

Commencing in four or five years, the total for reforestation and service to woodlot owners would therefore amount to $2,290,000 annually for a period of 10 years, with somewhat increased annual expenditures, possibly $3,000,000, in the following decade.

The spending annually of sums of money of such magnitude can only be justified if the situation is grave and if such expenditure will remedy it. I am convinced that the proposed plan will meet the requirements. I am equally convinced that the expenditures will prove to be self-liquidating, and in addition will provide many benefits. We are in the uneviable position of a people who have borrowed heavily from the future, whose loans are not only due but overdue, and with nothing to show for what we have spent.

It is unlikely that any major rehabilitation project of this nature can be financed out of revenue. The cost of the proposed plan should be considered an expenditure to replace depleted capital assets and the financing done out of capital raised for the purpose. The proposed expenditures for the reforestation of Southern Ontario would therefore be financially unrelated to the revenues from Crown lands situated elsewhere in the Province.

It is the general public, particularly those living in the older portion of the Province, who will enjoy the major benefits resulting from expenditures on forestry on private lands. It is therefore the general public, rather than the forest operators of Western Ontario, who should be the major source of capital for the expanded development of forestry on private lands.

If, as previously recommended in this report, legislation now existing in regard to County Forests is amended to include corporations, etc., trust and insurance companies who are looking for safe long-term investments could scarcely do better than to invest in the future of forestry in the Province. Government Boards, such as the Workmen's Compensation Board, must have difficulty in finding long-term investments, and no better or safer ones could be found than in private forestry. Money invested in forests under such agreements will yield returns which may not be spectacular but will be sure and safe.

I recommend that long-term bonds or debentures be issued, specially earmarked for assistance in reforestation. It is quite possible that many public-spirited citizens and corporations would accept a lower rate of interest than is currently demanded on similar securities, so that they may be identified with and share in the forest programme so necessary to the welfare of the Province.

In ending this chapter I cannot refrain from pointing out that descendants of the original settlers on the farms of Ontario are rapidly disappearing from the farms. I feel that this should not be allowed to occur without a sincere effort to maintain these solid citizens on the land where they can utilize the accumulated skill and knowledge acquired by several generations of their hardy and resourceful forbears.

Forestry could well be the means of making the countryside more attractive and interesting to the rural population and, if wisely developed, can certainly make the off-season for the growing of field crops the most remunerative portion of the year. I believe that if forestry is given a chance, it may well prove the influence which not only will overcome the present attraction of the cities for rural youth, but which may well reverse the flow and draw back from the crowded cities, to their proper environment, many of the sons and daughters who have already left the farms.

CHAPTER VII

Department of Lands and Forests

Before referring individually to the work of the various Divisions of the Department of Lands and Forests, and in order to indicate how they function, a few paragraphs will be devoted to the changes which led to the present administrative set-up.

In 1827, a Surveyor General of Woods and Forests in the Province of Upper Canada was appointed. He was vested with very wide powers under quite specific instructions from the Imperial Government, but the Family Compact of those days was evidently too powerful for him to carry out his duties as instructed. There was much dissatisfaction about the methods of dealing with the casual revenues from the disposal of Crown lands or the timber on them, and negotiations with the home Government proceeded over a number of years.

The Act of Union of 1840, adopted by the Imperial Government, placed under the control of the Canadian Legislature all territorial and other revenues at the disposal of the Crown and, in consequence, a Commissioner of Crown Lands for Canada was appointed to administer these revenues. In return the Legislature undertook certain obligations, including the civil list for the payment of the salaries of the Governor, Judges and other personnel, amounting to $75,000 per annum. The first annual report of the Commissioner of Crown Lands appeared in 1857 as the result of a motion of Hon. A. T. Galt in the House of Commons during the session of 1856.

Following Confederation, the first Commissioner for Crown Lands for Ontario was appointed in 1867 in the person of Hon. Stephen Richards, and the Department of Crown Lands came into being. In 1905, mines were brought under the Department, and it was named the Department of Lands and Mines of Ontario. The following year, 1906, the name was changed to Department of Lands, Forests and Mines and it so remained until 1920, when the administration of mines was segregated and the Department was renamed the Department of Lands and Forests.

In addition to mines, various other branches dealing with settlement, roads, game and fisheries, northern development, etc., have grown up with the Department as their parent. During 1946 the Department of Game and Fisheries returned to the Department of Lands and Forests and now carries on as the Division of Fish and Wildlife.

With the passing of years, many changes in administrative set-up have occurred. In earlier times there was a Crown Timber Agent and a Crown Lands Agent in each District and their work was not co-ordinated so as to achieve the best results for the Province. For many years there was a Provincial Forester whose work had to do with forest inventories, timber growth, nurseries, fire protection, etc., but the Crown Timber Agents supervised all cutting and seemed to look upon District Foresters as visionaries whose views on forestry were far from practical. If the views of these technical men had been heeded, the forests of Ontario would be in much better condition than is the case to-day.

Through the past quarter century there has been a tendency to centralize and consolidate the various activities of the Department so that they work in harmony with one another. The present Deputy Minister is much to be commended for his efforts toward this end. As such consolidation in a civil service organization presents many difficulties, due to the tendency to perpetuate old customs and methods as well as old jealousies, the progress already made is almost more than could have been expected. In order to achieve this progress, however, compromises have had to be made and accepted and, because of this, I believe that the appropriate time has now arrived for another major advance in organization within the Department.

An examination of the chart showing the present administrative set-up indicates that the arrangement of responsibilities has several fundamental weaknesses:

(a) Each District Forester deals with eleven Chiefs of Divisions who may issue instructions to him on matters of Departmental policy.

(b) Regional Foresters are in an unnatural position in that they have few administrative duties and are often by-passed in correspondence between Chiefs of Divisions and District Foresters. Their positions should be clarified and either given more weight or abolished altogether.

(c) There are no Assistant Deputy Ministers, but Chiefs of Divisions function more or less in that capacity. The result is that the Deputy Minister is overloaded with petty administrative decisions to such an extent that he has little time for field visits or constructive thought.

(d) Chiefs of Divisions move in such a restricted orbit that they have little opportunity of acquiring the general knowledge of the Department necessary to qualify them for further advancement. The result is that, should it be necessary to select a new Deputy Minister, the logical choice must be from the field forces who, technically at least, are junior to and receive instructions from Chiefs of Divisions. Regional and District Foresters have to deal with practically all phases of Departmental administration.

(e) There is a tendency for each Division to become a watertight compartment. The effect of this individualism is indicated in some of the material appearing in annual reports. All Divisions supply material to the Operations and Personnel Division who arrange for the preparation of the report. Errors appear in it which should be detected if there were a more intimate chain of responsibility, as indicated on the administrative chart submitted herewith.

Turning now to the chart showing the recommended administrative set-up, it will be noted that, instead of seven regions, each with a Regional Forester, who is not an administrator, **I recommend three regions, each under an Assistant Deputy-Minister, who should conduct all negotiations concerning operations in his Region. His decisions, however, must be in conformity with the policy which emanates from Head Office.** Consultation between industry and government concerning operations, leases, sales, etc., most of which now take place in Head Office, would be conducted through the Regional Office.

Attention is drawn to the fact that a representative of the Air Service is allotted to the staff of the Regional Office. His function will be that of adviser on air matters to the Assistant Deputy who would be responsible for the administration of the Air Service in his region. The regional representative of the Air

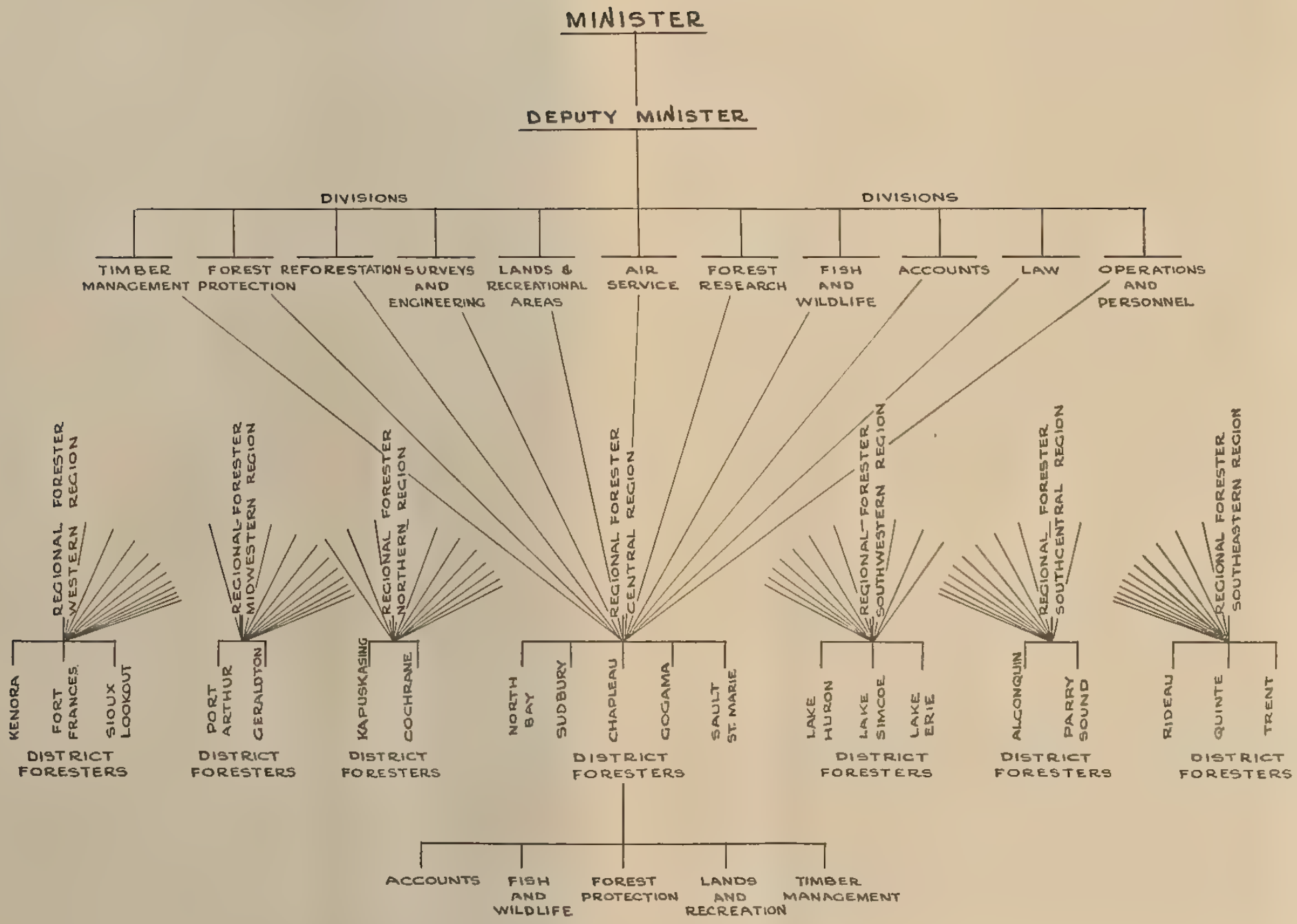


Chart showing the present organization of the Department of Lands and Forests.

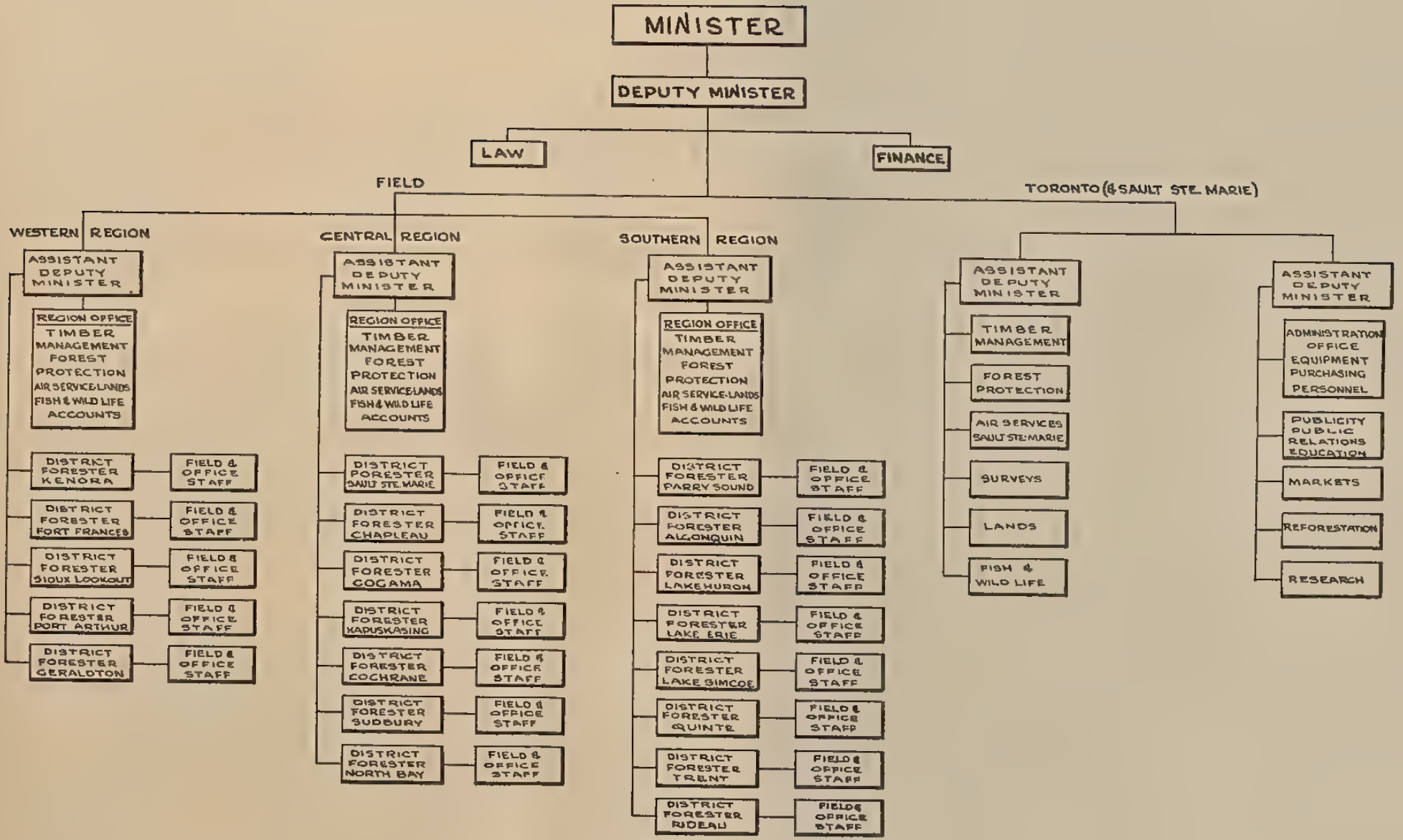


Chart showing the proposed reorganization of the Department of Lands and Forests.

Service would be appointed by the Chief of the Division of Air Services. The Air Service Chief would be considered a staff officer rather than an administrator, except for the supervision of winter-storage and the overhauling of aircraft.

Two Assistant Deputy-Ministers are recommended at Head Office, one to control those Divisions which deal mainly with forest operations and the other one for the remaining Divisions.

Division of Operations and Personnel

I have suggested a change from the confusing misnomer "Division of Operations and Personnel" to "Division of Administration and Personnel", or "Division of Office Management and Personnel". I also recommend that the Education and Publicity Section be removed from this Division and set up as a separate new Division.

Division of Education and Publicity

The possibilities of expanded activities in educational and publicity affairs, which are developed in a separate chapter, are so tremendous that their control should not be limited to the scope of a branch within a Division of the Department.

Marketing

I have also recommended a Marketing Division. This could serve as the co-ordinating agency in the sale of material from private lands and also could act as an adviser to hundreds of small mills regarding their output and its logical market. They could maintain statistics as to markets, price-trends, and world and domestic supplies. In depressed times their advice and co-ordinating powers could save many small operators from liquidation and the industry in general from the distress inherent in over-production during such periods.

As mentioned before, marketing advice and assistance to private-landowners might well be the agent which would bring the vast majority of that group to the realization of the value of their forests and thereby engender the urge to protect and perpetuate them.

Accounts and Law

I have placed the Divisions of Accounts and Law in positions reporting directly to the Deputy Minister. This gives them a status comparable to, but not the same as, Assistant Deputies. These two are service Divisions to all other Divisions and Deputies, and should not be under the direction of any executive below the Deputy Minister.

I recommend that all detailed accounting, all invoicing, collections, etc., be done in the Regional Offices, with Head Office dictating the policy and auditing regularly the work of the Regional Offices. District Offices would require cashiers only to receive monies for fish and game licenses and other small amounts, which would be forwarded to the Regional Office. This system would eliminate the major delays and errors inherent in the present system of over-centralization. It would also permit the Regional Assistant Deputy-Minister to know at all times how individual accounts stood, and would vest in him the knowledge and authority which Regional or District personnel now lack in dealing with operators. It is hoped that this would tend to end the practice of operators going to Head Office to seek favours or

to consummate agreements about which the District personnel know little or nothing.

The Law Division needs no counterpart in the Regions or Districts and its function should be that of interpreting the laws pertaining to forests, preparation of leases, and day-to-day counsel concerning the problems of the Department.

It must be realized that an individual or corporation enters into negotiations involving leasing or otherwise obtaining timberlands flanked by the best legal counsel obtainable. It is the custom, privilege and right of counsel to obtain the best possible bargain for his client, accentuating those clauses that are favourable and endeavouring to soften or eliminate those that are unfavourable. **I therefore recommend that, in negotiating future agreements concerning timberlands, the Department also employ legal counsel comparable to that of the applicant.** The idea is not novel as many large corporations maintain a legal branch for routine matters and employ outside counsel in all major undertakings.

Air Service

A somewhat radical change in the functioning of the Air Service is recommended. I foresee the Chief of the Division functioning as a staff officer rather than as an operator, setting policy and allotting aircraft to Regions. His main operational functions should be those of the winter-storage and overhaul of aircraft at Sault Ste. Marie.

I recommend decentralization of field control of the Air Service, giving to the Assistant Deputy-Minister at Regional Headquarters control of the aircraft allotted to his Region. On the staff of the Regional Headquarters would be an officer nominated by the Chief of the Air Service Division, but under the control of the Regional Assistant Deputy-Minister. This air officer would act as adviser in all matters pertaining to the operation of aircraft in the Region and he could serve as liaison officer between the Division staff and the Regional Staff. This would be an admirable method of employing the services of pilots who are no longer able to meet the physical standards required to obtain licenses to operate aircraft.

If the control of aircraft were a function of the senior officer administering the Region, it would eliminate petty friction which is sometimes in evidence between Air Service and District staff and it might well eliminate some overlap in administrative costs.

No Other Fundamental Changes

I do not recommend any other fundamental changes in set-up in the other Divisions shown on the chart, but will touch on some details in the more explicit discussions of some of the Divisions later in the report.

I strongly recommend a re-organization along the lines indicated in the chart, as it provides a rational line of succession leading to the position of Deputy Minister and places Head Office personnel in the position of staff officers forming and advising on policy, but leaving the implementation of that policy to District personnel, who are the logical group to perform that task. Exasperating experiences involving District personnel and the people with whom they necessarily deal could thus be avoided. It would eliminate the feeling of

isolation which exists amongst personnel in the Districts remote from Toronto. They are lucky if they see a Division Chief for a few hours once a year and several years may elapse between visits from a Deputy Minister. In the more distant regions there is a distinct impression in the minds of the public that a barrier exists between those regions and Head Office. They sense the limitations imposed on District and Regional personnel in dealing with day-to-day problems which could and should be left to the local staff for solution. This sense of neglect felt by the public and feeling of isolation in the minds of District personnel are very real.

The proposed changes in organization would do away with the present unnatural position of the Regional Forester who seems to be in a transition stage, with not enough administrative work or sufficient authority to justify his position. The situation cannot help but be confusing to most people who have to deal with District and Regional personnel.

Head Office personnel, notably in Timber Management and Accounts Divisions, now stagger under a load of administrative work. By being relieved of much of this detail, they would have time to visit the Districts regularly and to maintain personal contact with the men on the job, which is so vital to the success of any undertaking of this nature.

I would not be doing my duty if I proceeded to other subjects without focusing attention on the lack of assistants to Division Chiefs and key personnel generally. Assistants trained to take the place of their superiors are almost entirely lacking in the upper brackets of the Department. This is a most unhealthy condition which has been brought about by lack of funds and of suitable personnel at the salaries provided.

It is only because of a sense of duty and a love of their work that many members of the staff stay in their positions. At that, notable gaps have occurred in the service even in recent months, despite improved salary schedules. If the Service is to attract and maintain high-calibre personnel, it must be placed in a position to meet the competition of industry. Even the security generally supposed to be inherent in Civil Service appointments proved to be somewhat of a myth in 1934. The Department is only now beginning to recover from the blow dealt to it at that time. Men who live in fear of their positions work under a mental handicap which seriously impairs their efficiency. Unless we are willing to spend the money necessary to employ three or four times the present numbers of foresters and other technical personnel, including rangers, scalers, etc., forestry and the maintenance of forests in this Province will continue to deteriorate, because present staffs are totally inadequate for inspections and control. In a decade or two, forest industries will begin to shrink, with consequent distress to the communities concerned, loss of revenue and a general weakening of the economic fabric of the Province.

CHAPTER VIII

Legislation

There are scattered through the Statute books some twenty enactments dealing directly with the administration, protection and utilization of the Crown lands and forest resources of the Province. In addition, many other Statutes bear to a lesser extent upon forest operations, and a still further class relate directly or indirectly to the practice of forestry on municipal or private lands.

Many of the Statutes lay down general principles and leave the details of administration to be settled by Regulations made by the Lieutenant-Governor-in-Council. Such Regulations, when duly passed by Order-in-Council and published in the Ontario Gazette, have the force of law. Existing Regulations make up by themselves a considerable body of rules which are of prime importance to the operator.

This body of Statutory law has developed over a long period of years and bears obvious traces of hasty and often ill-considered tinkering. To find the laws by which his rights and obligations are prescribed, a forest operator must search through many volumes of Statutes and many issues of the Ontario Gazette, and having found the relevant Statutes and Regulations he will be perplexed by their lack of system or arrangement and by numerous ambiguities, inconsistencies and duplications.

I am heartily in accord with the suggestions made by many corporations, associations and individuals who have advocated a thorough revision of this whole body of Statutory law and Regulations. It would be a great convenience to forest operators, forest industries and the public generally to have those Acts which deal directly with forests and forestry matters consolidated into a single omnibus Statute, and to have other Acts dealing more indirectly with the same subject matter grouped together in the Statute book. The omnibus Statute to which I have referred might be divided into parts along the following lines:

PART I

A consolidation of Statutes which provide for the administration, protection and utilization of Crown lands and forests including such Acts as:

1. The Crown Timber Act, R.S.O., (1937) Ch. 36.
2. The Public Lands Act, R.S.O., (1937) Ch. 33.
3. The Forest Resources Regulation Act, R.S.O., (1937) Ch. 40.
4. The Forestry Act, R.S.O., (1937) Ch. 39.
5. The Cullers Act, R.S.O., (1937) Ch. 240.
6. The Mills Licensing Act, R.S.O., (1937) Ch. 37.
7. The Provincial Forests Act, R.S.O., (1937) Ch. 38.
8. The Provincial Parks Act, R.S.O. (1937) Ch. 94.
9. The Pulpwood Conservation Act, R.S.O., (1937) Ch. 41.
10. The Spruce Pulpwood Exportation Act, 4 Geo. VI, Ch. 27.
11. The Woodmen's Employment Act, R.S.O., (1937) Ch. 202.

Part II

A consolidation of Statutes dealing with forest protection including such Statutes as The Forest Fires Prevention Act, R.S.O., (1937) Ch. 325; The Railway Fire Charge Act, R.S.O., (1937) Ch. 326; The Fire Guardians Act, R.S.O., (1937) Ch. 327.

Part III

A consolidation of the Statutes dealing with the use of lakes and streams for logging purposes including The Lakes and Rivers Improvement Act, R.S.O., (1937) Ch. 45; The Bed of Navigable Waters Act, R.S.O., (1937) Ch. 44.

Part IV

A revision of the present Game and Fisheries Act, 10 Geo. VI, Ch. 33.

Part V

A consolidation of the laws relating to forestry on private and municipal lands including such Statutes as:

1. The Municipal Reforestation Act, R.S.O., (1937) Ch. 323.
2. The Settlers' Pulpwood Protection Act, R.S.O., (1937) Ch. 42.
3. The Private Forests Reserves Act, R.S.O., (1937) Ch. 324.
4. The Trees Conservation Act, 10 Geo. VI, Ch. 102.
5. The Nursery Stock Act, R.S.O., (1937) Ch. 43.

It is not feasible to include in a general Statute or collection of Statutes, such as mentioned above, every incidental reference in the Statute books to forestry matters; for example, The Mining Act, The Assessment Act and The Municipal Act all have sections of more or less importance relating to forestry or farm woodlots, but I do not suggest that the proper place for these long Statutes dealing mainly with other subject matters is in a collection of forestry and public-lands enactments. The consolidation which I have suggested might, however, contain a reference to particular sections of other general Statutes.

It need hardly be said that no revision or consolidation should be carried out until after careful study by the best legal talent available and after consultation with industry. Hasty or ill-considered action in this respect might well result in even greater confusion than now exists.

It is beyond the scope of this report to examine in detail the provisions of the Statutory law and Regulations now in force. It will be the task of legal experts to bring order out of the present confusion and to eliminate the uncertainties and inconsistencies which now exist. There are many points, however, upon which a definite policy will have to be formulated before the task of amendment and consolidation can be undertaken, and among these points I wish to call special attention to the following:

1. The obvious intention of The Crown Timber Act is to prohibit the export of unmanufactured wood. The power given to suspend the operation of the manufacturing conditions "for such periods as may seem proper and as to any district or districts which may be defined" is, in my judgment, intended merely as an exception to the dominant policy laid down by the Statute. The exception has now grown more important than the

rule, and if the present export policy is to be continued it should be clearly and explicitly authorized by the Statute itself.

2. Criticism of Ontario forest administration over a course of years has been founded mainly on the lack of a known and stable policy on essential points. Existing legislation confers on the Minister and on the Lieutenant-Governor-in-Council powers sufficiently wide to enable complete reversals of policy to be carried out without reference to the Legislature and without any notice to the public of what is being done. I am absolutely convinced that until the public generally, and those who are concerned in forest industries in particular, can feel confident that sound policies once adopted will not be abandoned to meet political exigences or at the whim of a Minister, there will be no satisfactory administration of our forest resources. I do not overlook the disadvantages inherent in too rigid a system, but I believe that, in the main, sound general policies once adopted should be embodied in Statutes where they are safe from interference without legislative action.

3. The Forest Resourses Regulation Act has aroused more critism and dissatisfaction on the part of limit holders than any other forestry law. It is attacked on the grounds that the power to interfere with contractual relationship can be exercised at the arbitrary discretion of the Minister of Lands and Forests, that such a power is a threat to secure tenure and that it will retard the application of management to forest lands.

   In view of the failure of existing contracts to give the Crown any right to reduce the size of limits which prove more than adequare for the needs of the limit holder, **I do not favour the repeal of the statute in toto, but would recommend amendments to ensure**

   (a) **that the power to interfere with contractual rights could be exercised only after the court or some other independent body had found as a fact that the limits held by a lessee were more than sufficient for his needs;**

   (b) **that stumpage rates could be altered only in order to bring them into line with rates generally prevailing and not, as the Statute now provides, as a blanket penalty for bad forestry practices or improper dealings with labour.**

   In my opinion, more attention has been focused on this Statute than its importance warrants. In this connection, the following points might be kept in mind:

   (a) Every agreement made since the enactment of the Statute in 1936 has been expressly made subject to *all* Statutes of the Ontario Legislature. In obtaining rights to cut timber on Crown lands, every operator since 1936 has, with his eyes open and knowing the obnoxious Act to be on the Statute book, chosen to go ahead.

   (b) The constant plea for security of tenure is greatly overdone. Nearly every operator in the Province has committed breaches of the terms of his agreement which would justify cancellation, not pursuant to the Statute, but pursuant to the contract itself. Fears for security of tenure have not had much weight in such cases.

(c) Other Provinces grant mere annual cutting rights and operators there appear to carry on without too much difficulty.

4. Section 23 (4) of The Forest Fires Prevention Act, which was added in 1946, provides that when fire originates in any particular area in which summer operations are carried on under permit, in the absence of evidence to the contrary, satisfactory to the Minister, the fire shall be presumed to have resulted from such operations and the operator shall bear the full cost of controlling and extinguishing the fire. This section is contrary to one's ideas of fair play and British justice and should be amended so as to throw the burden of proof on the Crown and to substitute the decision of the Courts for that of the Minister as to the sufficiency of evidence.

5. Provision should be made for the holding of an enquiry at the request of the District Forester, by properly qualified officials appointed therefor, immediately after a fire has occurred in order to determine responsibility while memories are fresh and witnesses available.

6. A great deal of confusion exists in respect of unopened-road allowances in Township Municipalities, especially in the less settled parts of the Province. **I recommend that this subject should be considered and that the law should be clarified.** It might be advisable to provide that municipalities should be required, within a limited time, to specify what road allowance they intend to make use of and that those not so specified should revert to the Crown.

7. Consideration should be given to incorporating into the Statutes many of the details which are now governed merely by Regulations. Many of the Regulations which have been in force over a long period of years have stood the test of time and have proved their usefulness. The inclusion of such Regulations in Statutes will assist in stabilizing forest policies.

8. **As has been recommended in an earlier chapter of this report, The Municipal Drainage Act and The Ditches and Water Courses Act should be amended immediately in order to curtail the detrimental effect of those Statutes upon woodlots and farmlands in the southern parts of the Province.**

When the work of revision and consolidation has been completed, I recommend that copies of the relevant Statutes and Regulations be made available to the public in loose-leaf form and that supplements covering annual amendments and additions be supplied.

CHAPTER IX

Timber Management

The Division of Timber Management keeps inventories of forest resources and deals with all timber applications, sales and licenses. Its functions also include the supervision of pulpwood exports, of working plans and of the arrangements for the scaling of wood and the inspection of cutting operations; in addition it maintains records in connection with cutting operations and pulpwood exports.

Its position as the source of advice to the administration on matters pertaining to the leasing of timberlands and the setting of rates for stumpage and ground rent, and its action in devising and implementing cutting regulations, makes it the most important Division dealing with Crown lands.

Because of these key functions it is almost inevitable that it should exert a tremendous influence in maintaining existing policy, or shaping new policy, following a change of government or even of Ministers. As a civil servant has few, if any, adequate means of preventing precipitate or unwise action by those in power, whether or not he agrees with such action, it is difficult to strike a proper balance now, concerning the responsibility for what has taken place over the years, as between successive governments and their civil service advisers.

Some of the transactions which have been carried out, particularly in Western Ontario, are difficult to explain or justify in the light of present-day knowledge. Vast areas of forest lands were leased, with the construction of a small mill included in the terms of the agreement. The size of the mill specified, when viewed in relation to the size of the area involved, suggests that speculation in standing timber was the real reason for many of the transactions. Few of the mills were ever built though the traffic in timberlands continued. A few years ago timberland, leased to companies with mills in operation, was withdrawn and re-allocated to a new company having only the project for a mill, without sufficient regard for the future of either the existing mills or the one proposed.

PRODUCTION OF SAWLOGS BY PULPWOOD OPERATORS

Practically all pulpwood agreements contain clauses providing that the Minister may direct that sawlogs shall be cut as such, but there is a bewildering variety in the form of these clauses as they appear in the different contracts. The practical result has been that few sawlogs have been produced on the basis outlined, although a couple of pulp and paper companies supply considerable quantities of logs to sawmill operators under private arrangements with the operators involved.

The futility of the sawlog clauses in existing agreements was well demonstrated during the 1942-43, and 1943-44 cutting seasons. Great Lakes Lumber and Shipping Limited, with little in the way of timber resources, was permitted and even encouraged to build a large sawmill in Fort William, during the early days of the war, in order to assist in meeting the critical needs for lumber.

On account of the existing woods-labour situation, coupled with the inherent reluctance of many pulpwood operators to deal with sawmill operators, the large new mill of Great Lakes Lumber and Shipping Limited received insufficient logs to operate to capacity.

The Minister of Lands and Forests attempted to supply the mill with logs by asserting his right to require the production of sawlogs by several pulp and paper companies operating in the Lakehead area and on the north shore of Lake Superior.

When each individual contract was studied it was found that no general formula or instructions could be applied to achieve the desired result. Under pressure from the Department, however, several companies produced a total of some hundreds of thousands of logs without any guarantee that they would be accepted by the prospective purchasers. They were not accepted and much argument ensued, with another Lakehead sawmill eventually purchasing most of them. A Royal Commission, set up to suggest a solution to the difficulties which had arisen, discovered the conditions to be as related above but finding that the problems presented involved enquiries far beyond the scope of the Commission then existing, they did not make any final report.

The major source of sawlog supply for the mill of Great Lakes Lumber and Shipping Limited is provided by two Orders-in-Council permitting this company to cut logs on pulpwood concessions.

Under an Order-in-Council dated 18th September, 1940, the Minister of Lands and Forests was empowered to enter into an agreement with the above mentioned company to cut spruce over 11 inches in diameter 18 inches above the ground and balsam on various limits as follows:

Abitibi Power and Paper Company Limited	435	square miles
Lake Sulphite Company Limited (now Brompton Pulp & Paper Company Limited)	205	" "
Nipigon Corporation Limited	90	" "

A subsequent Order-in-Council dated 28th April, 1941, similarly approves an agreement to cut large-size spruce, balsam, jack pine and poplar sawlog timber on the limits of the Pulpwood Supply Company Limited (Long Lac Concession, then comprising 2,616 square miles).

These Orders-in-Council are still in effect although Departmental permission to cut is at present confined to the first mentioned parcel, namely that of the Abitibi Power and Paper Company Limited.

Such arrangements are at best a makeshift and must be highly irksome to all concerned. The sawmill lacks assurance of continued supply and the pulp and paper companies involved cannot accurately estimate the effect that possible cutting programmes for sawlogs may have on their future sources of pulpwood supplies.

I am convinced, particularly in times when woods labour is scarce, that any effort to provide sawlogs under the terms in existing agreements will meet with similar inconclusive results and that the problem can best be solved by the application of the recommendations in the final chapter of this report.

The pictures on the next page and on page 44, indicating the presence of sawlogs on pulp and paper company limits and the use of these sawlogs as

Piles of eight-foot pulpwood containing much material suitable for sawlogs. (Domestic company operation.)

Pulpwood of sawlog size. Diameters may be judged by comparison with the hat. (Domestic company operation.)

pulpwood, are illustrations of a condition which I found to exist generally throughout the northern and western parts of the Province.

The question of sawlog production is not the only one which requires remedial action. There are many inconsistencies due to the infinite variation in provisions of licenses as well as agreements.

VARIOUS TYPES OF LICENSES AND AGREEMENTS

In addition to contracts resulting from the acceptance of offers for timber put up for sale by public tender and involving comparatively small areas, there are now in force some 51 so-called timber and pulp concession agreements. These agreements are for long terms, either 10 or 21 years, and usually with a right of renewal, and they deal with areas of considerable extent. They may be divided into three main classes:

(a) Agreements conferring the rights to cut sawlogs only.
(b) Agreements conferring the right to cut pulpwood only.
(c) Agreements conferring the right to cut all classes of timber.

The agreements conferring the right to cut pulpwood only and those conferring the right to cut all classes of timber may be further sub-divided into the following classes:

(i) Agreements requiring the operation of a domestic pulp and paper mill, with or without export privileges.
(ii) Agreements permitting the export of pulpwood but not requiring the operation of a domestic pulp or paper mill.

Agreements at present in existence have practically all been negotiated within the past 20 years, with a majority in the past ten years. Some of the present-day agreements are based on, or are renewals of, earlier agreements which were entered into in the early 1920's. The form in which the fundamental provisions are stated varies from year to year and there is a marked lack of uniformity in the case of agreements falling within the category of any one of the single classes mentioned above. One can only conclude that in respect to many important details, a general line of policy has never been adhered to, and that each individual contract is the result of a process of bargaining in which the interests of the Crown have not always been fully safeguarded.

Some agreements concerning sawlogs specify payment of stumpage on the basis of Doyle Rule, while others specify a rate per M feet board measure but do not mention Doyle Rule. The fact that the rule is mentioned in some agreements prevents its abolition merely by regulation, and necessitates a Statute to do so if such is desired.

Increased pulpwood exports permitted from Crown lands make it apparent that the Department has adopted the practice as a policy, but apart from the decision as to the general principles involved, there seems to have been little thought given to the terms and conditions under which the rights of export may be exercised. This is exemplified by the fact that some agreements (notably some of the later ones) require the building of a pulp mill in Ontario while others carry no obligation of this sort. The quantity permitted to be cut per acre per year varies very widely and in many cases grossly exceeds the annual growth under the cutting methods used. In other instances the agreement only covers

the cutting of spruce and balsam pulpwood, thereby placing the cutting operations practically on a mining basis. In one agreement "pulpwood" is specified without mentioning the species.

It would probably be futile at this late date to attempt an allocation of responsibility for the diversity of terms in the various agreements. Provided that immediate action is taken to correct, simplify and standardize conditions so as to ameliorate the mistakes of the past and guard against those of the future, little purpose would be served in endeavouring to apportion blame.

There are several points about the agreements, some of minor importance but others of a more serious nature, which should be considered:

(1) Agreements involving the export of unprocessed pulpwood are all based on a clause in The Crown Timber Act which provides for such practice as an exception. The whole structure of the Act argues against the export of unprocessed wood; but agreements, involving many thousands of square miles of timberlands, have been executed for long-term periods based on the exception to the rule. This subject will be developed in Chapter XV on Export of Pulpwood.

(2) In nearly every case it is provided that the agreement shall be subject to all Acts of the Legislature, which are now or which may hereafter be in force, and all regulations duly made under the provisions of any such Acts, so far as they are of general application.

It is quite right to stress the fact that the Legislature has the power to change or nullify by Statute any or all agreements with the Crown. Operators should fully understand this fact and no term should be permitted in a contract which appears to limit the rights of the Legislature in this respect.

(3) In many cases, particularly in export contracts, the operator is required to cut a minimum number of cords each operating season and is permitted to cut up to a stated maximum. The same contracts require the concessionnaire to operate in accordance with good forestry practice, and to file a working plan providing a general scheme for the operation and management of the area so that it will be kept productive, all in accordance with The Pulpwood Conservation Act. These provisions appear to be quite inconsistent; the question will arise which is to prevail if the plan filed establishes the fact that, by practising good forestry the maximum, or even the minimum, cut cannot be allowed.

This difficulty could easily be avoided by making the paragraph which deals with quantities "subject always to the right of the Minister to restrict the cutting if, in his opinion, good forestry practice so requires."

(4) All operators are now required to file working plans. In some cases agreements expressly provide that, if the inventory reveals a shortage of wood, further areas will be made available; but no single contract permits the Minister, upon it being established that an operator has more timber than he requires, to decrease the acreage. In such a case, of course, the Crown is not left without remedy. It can exercise its powers under The Forest Resources Regulation Act; but it seems unfair that, while the operator may rely on his contract for the protection of his interests, the Government may be compelled to have recourse to an unpopular and much critized piece of legislation in order to protect the legitimate interests of the public.

(5) Provisions as to the duty of operators in making and filing operating plans have varied widely since they were first embodied in Concession Agreements. These provisions have been revised and greatly elaborated in some of the latest Agreements, but the utilization of the information included in the plans is not clearly stated. If, as I believe, it is intended to be used in operating the area in such a manner as to keep it productive in perpetuity, then this aim can be more clearly and simply stated.

(6) Provisions added in some of the newer agreements dealing with co-operation in the purchase of settlers' wood, state that all *bona fide* accounts due for settlers' pulpwood purchased by the operator shall constitute a first claim against the operator. I regard this clause as meaningless. The Crown surely cannot confer a prior right to the payment of one class of creditors as against other classes by an agreement to which none of the creditors is a party. The provision is misleading and might easily make settlers think that they have some protection against bad debts, whereas none is provided by this clause. It is possible that the Crown merely intends to authorize the company to give settlers' claims priority over its own.

(7) The amount of cash deposit varies widely and does not appear to be related to either the area of timberland involved or to the investment the operator has made in mills or improvements. The amount of deposit should bear a fixed relationship to the amount of the companies obligations in respect of annual dues and charges.

(8) The wording used in one agreement purports to permit the operator to continue the export of unprocessed pulpwood for the full term of the contract (till 1962) "notwithstanding any Statute which might be passed to the contrary". I contend that the clause is meaningless and does not bind the Crown. If, as was stated at the public hearings, the purpose of this clause was to make it easier for the company to arrange its financing in the United States, I regard its inclusion as highly improper.

DRAFTING OF AGREEMENTS

It is very strongly recommended that the policy of the Department in respect of such matters as the conditions under which export will be permitted, the production of sawlogs by pulp operators, the production of pulpwood by timber operators and the production of pulpwood for domestic mills, should be definitely determined and a standard, carefully prepared form of agreement adopted which would meet the requirements of every individual case. It is true that there are some details which obviously must vary with each agreement, but apart from these few, there are many matters of general application (or which should be of general application) to all operators, such as:

Right to use watercourses,
Deposit of security,
Payment of 20 per cent of the stumpage dues in advance each season,
Preparation of inventory,
Filing of working plans,
Purchase of settlers' wood,
Minister's consent to yearly operations,
Payment of ground rent and fire tax,
Measurement of pulpwood,

Qualifications as to purpose for which exported pulpwood shall be used,
Returns,
Right of inspection,
Pollution of streams,
Applicability of Statutes,
Pulpwood for domestic use,
Production of lumber by pulpwood operators,
Labour,
Default, etc.

All of these general matters should be omitted from the individual contracts and replaced by a single general provision that the contract shall in all respects be subject to the provisions of all Statutes now or hereafter in force and to all regulations made thereunder.

The advantages of such a course are almost too obvious for comment, but the following points may be briefly referred to:

(a) Great saving of time in drafting agreements and less possibility of mistakes;
(b) Encouragement for the formulation of a definite and fixed policy covering all details of operation;
(c) Facility in effecting a change of methods over the entire industry by regulation;
(d) Equal treatment of all operators.

A carefully worded agreement prepared in consultation with the best legal talent available would prove good protection, not only for the Departmental officers, but for the public as well. Such an agreement should not, however, be looked upon as a substitute for a firm and enlightened over-all forest policy.

ALLOCATION OF LIMITS

I consider the present allocation of Crown lands to limit holders to be illogical and uneconomic in many instances. Often there is little apparent relationship between the size and location of the limits and the location and capacity of the mills served by them. Some units of industry have more than enough resources to support them, while others cannot maintain their present production, still less increase it. The right is granted to export large quantities of pulpwood cut on limits which could properly support domestic industry, while more distant forests remain unharvested. Generally speaking, the pulp and paper group—both domestic users and exporters—is better served as regards limits than the domestic manufacturers of lumber, ties and poles. Most of these conditions are wasteful of the Province's resources and all are unsound from the long-term viewpoint.

It should be pointed out that manufacturers of lumber, ties and poles are themselves largely to blame for their present situation. When limits were available they did not undertake the obligations inherent in the leasing and holding of Crown lands, but for the most part chose to operate on a shoe-string basis, with the result that many of them must now subsist on material purchased from pulpwood concessions. Extensive areas of timberland are no longer available in proximity to most of the existing mills. Unless remedial measures are taken, many of the mills will disappear within the next decade or two.

Leasing of areas for single-purpose operations has been a long established practice but such operations create, and will continue to create, a tremendous waste of timber. Elimination of single-purpose logging operations should be given the very earliest consideration possible.

INSPECTION AND SCALING

The inspection of woods operations is most inadequate. This is due largely to lack of staff which, in turn, is the result of non-competitive wage schedules and working conditions. Top rates during 1946 for casual personnel employed as fire rangers, towermen, etc., was $4.00 per day, with the individual providing his own board. During the same season, sawmill workers were earning almost twice as much, pieceworkers on pulpwood operations were earning three times as much and many pieceworkers producing poles were earning four times that amount. It is therefore not difficult to imagine the problem the Department faced, both in obtaining new men and in retaining their staff.

The problem of obtaining new and suitable personnel is very real and must soon be solved, as the average age of scalers, rangers and towermen is now very high, the majority being past middle age. Recent efforts made by the Department to lower the average age and generally improve the efficiency of scalers and rangers is most commendable but it should be accelerated. Like all similar programmes, it will result in apparently increased expenditures, but the savings thereby made possible will reimburse the government many times over.

The Division has produced an excellent manual on scaling for the guidance of the field staff, and has promulgated many regulations dealing with most phases of woods operations. Unfortunately these have not been combined in a concise booklet and are not uniformly known or applied by all concerned. I have observed many instances of differences in methods or policy on the part of scalers in different districts and even in the same district. This would be inexcusable and probably would never occur if all regulations were consolidated into one booklet and copies were supplied to the Districts in numbers sufficient to distribute a copy to every party interested, including the operators. It would pay to do this, despite the expense and work entailed in frequent revisions.

I am firmly of the belief that the Air Service could be more widely used to good and economical effect in winter inspection and scaling operations and I have referred to the suggestion in Chapter XI on the Provincial Air Service.

STATUS OF SCALERS

The question of the status of scalers is one that I consider most important. A scaler working on an operation is normally dependent upon the foreman or jobber for housing and food. If he is unpopular with that individual because of his insistence on the observance of regulations, he may suffer, particularly in the matter of sleeping accommodation, and his stay in the locality can be made most unpleasant. **It is recommended that for the future, scalers be provided with private cabins and beds on all but minor operations, and that a ticket system should be instituted, whereby they can exchange a ticket for a meal in any camp, with the government reimbursing the operator at the end of each season for all meals supplied.**

In this manner, the scaler would be entirely independent of the operator and far more likely to scale and inspect in an unbiased manner. He should

never be forced into the position of a suppliant to the operator for benefits of one sort or another. It is my contention that the status of scalers and inspection personnel generally should be raised, so that when they arrive on an operation they will be treated as men of consequence and therefore commanding respect. This is definitely not the condition now existing. The wearing of a distinctive uniform will do much to alter this. No doubt a few of them may, in the initial stages, be inclined to overestimate their own importance, but this tendency could easily be checked.

In questioning scalers in widely separated areas as to why certain wasteful practices were tolerated many of them stated they were afraid that, if they insisted on compliance with regulations, the influence of the operators would cause their removal to another locality at considerable cost and inconvenience to themselves and their families. I found no case in which such action had been taken and I do not believe there is any likelihood of it, but I have no doubt that some foremen and jobbers may have used the threat. I mention the matter because the fear undoubtedly exists in the minds of the scalers. It should be allayed.

TIMBER RETURNS AND ACCOUNTING

Varying clauses in agreements, as well as wide ranges in stumpage rates in hundreds of licenses, create a condition which places an unnecessary and exasperating load on the accounting personnel in District Offices. It takes months to carry out and check work which should require only days if conditions were standardized.

The following tabulation will serve to emphasize the above statement. Only a few species are included, but they illustrate the general condition.

Sawlog Stumpage Rates in Effect

White and red pine	89 rates varying from	$2.50	to	$25.75 per M. f.b.m.
Spruce and balsam	82 rates varying from	2.00	to	13.50 per M. f.b.m.
Jack pine	78 rates varying from	2.50	to	13.25 per M. f.b.m.

Pulpwood Stumpage Rates in Effect

Spruce	49 rates varying from	$1.40	to	$4.25 per cord
Balsam	45 rates varying from	.70	to	3.00 per cord
Jack pine	26 rates varying from	.40	to	2.75 per cord

DEFINITION OF A CORD

There is no standard "cord" recognized by the Government of Ontario for the assessment of stumpage, although a cord is defined by Act of Parliament. On woods operations on Crown lands, the cord may consist of any one of the following:

(a) Unbarked wood—4′ x 4′ x 8′ with an overlength tolerance of 2″ per stick, or roughly four per cent. The volume of a well piled cord of unbarked sticks of medium size will amount to about 88 cubic feet of solid wood+four per cent for overlength, or 88+3.5=91.5 cubic feet.

(b) Barked wood—4′ x 4′ x 8′ with no tolerance for overlength. On medium-size wood the removal of bark permits of more solid wood per

cord to the extent of 14 per cent or 15 per cent. The volume of a well piled cord of barked sticks of medium size is therefore $88 \times 1.14 = 100.3$ cubic feet.

(c) Where longer logs are utilized for pulpwood and measured by cubic volume, stumpage is levied on the basis of 100 cubic feet=1 cord.

It should be emphasized here that, under the piecework system in this Province, the practice of barking pulpwood in the forest is extremely wasteful of raw material. Pieceworkers almost invariably leave all partially dry logs, or those with many knots, to rot on the ground because both are difficult to peel and therefore interfere with production and earnings. Such logs may usually be found concealed under brush heaps, although many are brazenly left in the open.

ANNUAL REPORT

The Annual Report of the Department of Lands and Forests should, I believe, be primarily concerned with keeping the public informed concerning their forest heritage. Many reports in the past couple of decades give the impression that they were prepared from material assembled in providing answers to questions of a Minister, rather than for the purpose of informing the public.

That for 1945 is a considerable improvement over its predecessors but the portion pertaining to timber management could be further improved by a consolidation of the total cut of each species with the total revenues received therefor. The revenues from material cut under permit are not shown, though in the aggregate they amount to a considerable sum.

Nine-inch dry spruce top wasted because it was difficult to peel. (Pulpwood-exporting company operation.)

I consider that the tabulations concerning small areas of timber sold or abandoned could be summarized, so as to show total areas for Districts with price ranges for these Districts, and the picture so revealed on one page would be more striking than that contained on the ten or more pages now used.

It does seem that something could be done to expedite the process of bringing information concerning a season's operations before the public. Information in the report for 1945, which has been circulated in April, 1947, deals with the timber-cut of 1943-44 harvested under wartime conditions. The timber agreements included were also signed in 1944. I suggest consideration of the possibility of having the period covered by the report different from that of the fiscal year. In New Brunswick all operations till October 31st in any year are included in their annual report which is issued to the public in the spring of the following year. In this manner, information is received before it is too late to take remedial action if such is necessary and, in addition, the report can be tabled at the session of the Legislature following the cut.

I recommend that study be given to ways and means of speeding up the preparation and issue of the annual report, as well as in re-arranging and consolidating tabular information so as to give the most complete picture possible from the information on hand.

MAPS AND STATISTICAL INFORMATION

A more comprehensive system of filing and tabulating data concerning licenses, agreements and information on wood exported would be of much benefit in the Division of Timber Management. The present system does not make information readily available, although it can usually be obtained eventually. The lack of over-all up-to-date maps retards the search for information, which is spread over dozens of small map-sheets and, in some instances, does not agree with the data provided in District offices. This, I believe, has been responsible for a couple of instances in which it was noted that similar rights were conferred on two companies for the same area.

I recommend an overhaul of the office administration and filing system in the Division of Timber Management.

CHAPTER X

Forest Protection

Most of the public think of forest protection in terms of fire prevention and fire fighting alone. In its studies, this Commission has adopted a more comprehensive viewpoint leading toward control of all destructive agents which threaten our forests, whether they be men, animals, insects, diseases or the elements.

CONTROL OF HUMAN BEINGS

Most chapters of this report deal with the elimination of the waste and loss which may be attributed to human agency. They may quickly be controlled and minimized by sensible regulations uniformly and, where necessary, rigorously enforced, and amended from time to time as research indicates such need.

Education as to the ownership of our forests, and the fundamental role they play in maintenance of our national prosperity and enjoyment, should eventually remove the need for many punitive regulations. Unfortunately some restrictive measures will always be required to protect the public from the greedy or thoughtless individual or corporation. Such measures will have to be accepted by those whose actions do not require them, as well as by the culprits who make them necessary.

CONTROL OF ANIMALS

It is not generally recognized that, though they derive little benefit from it, cattle grazing in the forests cause greater damage to the forests than any other action attributable to animals. The loss so caused on farm woodlots is tremendous and, as mentioned in Chapter VI on Private Lands, could be eliminated by fencing.

In my opinion, of the forest losses attributable to animals, the extent of the damage caused by porcupines is second only to that of grazing cattle. They remove very considerable areas of bark from trees, in many instances killing them by girdling, but in any event so weakening them that they are a prey to disease. During the past season I have seen tens of thousands of trees, mostly jack pine, so damaged and I would estimate that the total numbers affected throughout the Province must therefore amount to many millions. This constitutes a very serious loss and I have not been able to discover any specific compensating factor.

There is a widely held idea that porcupines are protected because they are one of the few animals a lost and hungry man can capture and kill easily. In many years of wide contact with woodsmen, hunters and forest travellers generally, I have never met nor heard of anyone who had, of necessity, caught and eaten a porcupine. I have been told of a few instances in which porcupine flesh has been eaten by humans, but in all cases it was curiosity rather than necessity which prompted the action.

Balsam and white spruce stand badly damaged by spruce budworm. Such timber should be salvaged immediately.

No legal protection for porcupines actually exists. In the Maritime Provinces there is a bounty for their destruction. However, as a result of the imagined protection in Ontario, the porcupine population has, I believe, increased beyond the needs of the biological balance of our forests. **I recommend that for a few years the killing of porcupines be encouraged and that research be carried on, in the meantime, to ascertain the minimum population needed.**

The extra protection afforded to beaver in recent years has apparently been effective in increasing their population and the results of the new colonies start-

ing up are evident over widely scattered areas. In order to flood their lodges they dam small streams at strategic points, causing water to spread over considerable areas, which inevitably kills the trees on the areas so flooded.

A widespread survey of this damage, studied in conjunction with an analysis of any economic and other benefits resulting from the beaver population, is necessary before formulating a policy. It is possible that the beaver may be more valuable than the forests affected, but many thousands of acres, mainly of pulpwood forests, are involved.

CONTROL OF INSECTS

The ravages of forest insects are less spectacular than those of forest fires and, consequently, the losses attributable to them have never received the publicity justified by their magnitude. With the improved and efficient fire-protection methods now practised and their probable further improvement and extension, it is expected that losses from forest insects will, in the future, far exceed losses from fire.

The spruce budworm epidemic, now extremely serious in the Province, has already killed hundred of thousands of cords of balsam in widely scattered areas and threatens many millions of cords of balsam and white spruce throughout the province.

The present outbreak was first noticed in the areas adjacent to Sault Ste. Marie in 1936, but it has spread widely since that time. In addition to an extensive destruction of balsam in that region, the ravages are plainly seen over large areas between North Bay and Timagami, south of White Lake, southwest

A healthy young stand of mixed softwoods. Compare with the illustration on the opposite page.

and west of Lac Seul and in the neighbourhood of Lake Nipigon. This last mentioned outbreak is the most serious as the area covered is large and carries a very valuable stand of timber; in addition, the insect has seriously attacked and is killing white spruce as well as balsam. **Salvage of damaged timber, some already killed, some dying, is imperative and should not be delayed.**

There are minor areas of budworm-killed timber widely scattered but the areas specifically mentioned are those where virtually complete destruction of mature balsam has occurred over a large number, in some cases hundreds, of square miles.

Spraying with insecticides such as D.D.T., which is very costly, has not been completely successful in combatting the pest and results to date indicate that future action of this sort will only be justified in combatting incipient outbreaks when very intensive treatment can be repeatedly applied to a few square miles.

Possible control measures on a wide scale lie in the discovery of some virus disease which will kill the spruce budworm at some stage in its life-cycle, or in some fungus disease which will destroy it when in the dormant pupal stage. Vigorous research in these directions is already being conducted. Research in the possibility of control through some virus disease has been started in Europe, mainly in Germany, where an insect similar to our spruce budworm is held in check by some undiscovered influence, possibly disease. Studies of the possibilities of fungus attack are being made, at the Forest Insect Laboratory in Sault Ste. Marie, which are very promising.

It is doubtful if any economically feasible remedial measure will be developed in time to end the present epidemic before it subsides of natural causes. Such outbreaks occur at varying intervals and it is to be hoped that the entomological activity engendered by the present outbreak will culminate in knowledge which will enable us to stamp out coming epidemics while they are in their incipient stages. It is extremely probable that such knowledge will be obtained.

There is also a jack pine budworm active in the English River district, west of Lac Seul, with an incipient outbreak of the same insect southeast of Chapleau. The latter situation only developed in 1946 and it will be interesting to see whether or not it is possible to control it by spraying with insecticide.

It must be realized that all the native insect pests are always present in our forests. Fortunately these pests all have their parasites and predators which normally keep them under control. These pests, however, are not apparent to the ordinary person until such time as conditions extremely favourable to their propagation permit them to outstrip, temporarily, the breeding capabilities of their parasites. An epidemic condition then occurs which rages until the population of parasites and predators can build up numbers sufficient to restore nature's balance once more.

When foreign insect pests happen to find their way into our forests, possibly none of the native species of parasites will attack them and, in consequence, they may multiply unchecked and do tremendous damage before they are recognized and remedial measures are taken for their control. This was the case of the spruce sawfly in Eastern Canada and New England a few years ago. It was brought under control by a virus disease fortuitously imported from Europe with the insect parasites intended to prey on the sawfly. The larch sawfly,

presumably of European origin, was accidentally introduced into Eastern America some time during the last quarter of the past century. It became epidemic in Canada in the early days of this century and raged unchecked for years, destroying virtually every mature larch (tamarac) tree from the Prairies to the Maritimes before it subsided, mainly because of lack of food. It is still with us, although parasites for it have developed over the years.

Other potentially dangerous insects which attack conifers and are known to be present in Ontario's forests include the:

Hemlock looper—A measuring-worm type of caterpillar which attacks balsam and hemlock.

Pine sawflies—Several species which attack pines are present in Ontario. Lecontés sawfly is one of these which is particularly destructive in red pine plantations.

White pine weevil—This native insect attacks white pines by laying eggs in notches cut in the leading or top shoot of young trees. The larvae, when hatched, eat downwards under the bark, killing the shoot. Several shoots may then attempt to dominate as the leader, but the weevil usually attacks them also with the result that, instead of a properly shaped tree, a worthless bushy shrub grows, with half a dozen or more shoots struggling to serve as the main stem. It is one of the chief deterrents to the successful growth of white pine over large portions of Ontario.

European pine-shoot moth—Not widely known but causes considerable damage in Scotch pine and jack pine plantations in the southern part of the Province. It attacks and destroys the leading shoot.

Eastern spruce bark beetle—The bark beetle usually attacks trees which are in a weakened or dying condition due to age or attack by other insect or fungi. Adult beetles lay their eggs in galleries tunneled under the bark of the host tree. The grubs which hatch from these eggs excavate individual mines under the bark. The thousands of small mines so formed quickly kill the already weakened tree.

Sawyer beetles—These beetles attack and seriously damage fire-killed standing timber and logs sawn and left in the forest throughout the summer. They are usually either black or grey and are distinguished by their long antennae. The grubs which hatch from eggs deposited in notches cut in the bark, bore long tunnels of about the same diameter as a lead pencil and a cone-shaped pile of borings may always be found below the mouth of the tunnel. Lumber sawn from logs affected is usually of extremely low grade, if not cull.

Insects detrimental to deciduous trees in Ontario include:

Striped maple worm—Defoliates maples and has been particularly active on Manitoulin Island, killing some of the stands affected.

Maple leaf cutter—Defoliates maple trees, causing a loss of vigour and a decreased sap-flow.

Tent caterpillar—This insect, familiar to almost every person, periodically defoliates extensive areas of poplar and attacks other trees also. Its parasites usually regain control of it without serious mortality to the host trees.

Bronze birch borer—Has not yet appeared in Ontario, but it is associated with serious mortality in birch stands in New Brunswick and Eastern Quebec and is a threat to similar stands in this Province. Whether it is a primary cause of tree mortality or attacks stands weakened by disease, has not yet been established but is under study.

When one speaks of insects as pests, one usually speaks of them in terms of human relationships and forgets that often man himself is the prime mover in calamities which befall the forests.

The best scientific evidence available indicates that many forest-insect problems are at least intensified, if not primarily caused, by not using, or making incomplete use of, certain tree species. Some trees are not removed by the operator of a limit for some reason or other, perhaps because they are less profitable than other species or will not float, or because the terms of the lease do not permit him to cut them. Nature's balance, established over decades and even centuries, is thus seriously disturbed and fertile breeding grounds are provided for the rapid multiplication of many destructive insects. It may be that the habitat of the parasite is destroyed, while the conditions favourable for the destructive insect are improved, in which case an epidemic is generated.

Proper silvicultural practices for maintaining a healthy forest with a fair biological balance have been successful in preventing serious insect ravages in European forests for more than a century, and there is every reason to hope that similar practices here will tremendously improve future possibilities. It will take many years of patient effort to achieve such a balance in Ontario, but the commencement of such effort should not be postponed.

There is little doubt that severe insect epidemics occurred in many regions before operations on any considerable scale were carried out. Silvicultural methods in any one Province will not protect it from insect infestations originating outside that Province, although it is a notable fact that healthy forests of proper age are rarely seriously damaged, even though attacked.

The preceding paragraph brings up the matter of the national and international nature of insect infestations and epidemics. They recognize no boundaries, interprovincial or international, and they must therefore be treated on the widest possible basis. This fact is recognized by all who have to deal intimately with the subject.

The Division of Forest Insects of the Entomological Branch, Department of Agriculture, at Ottawa, is the central body dealing with forest insects in Canada. It co-operates closely with the Provinces in conducting a survey of the incidence of insects of all sorts inhabiting our forests, and maintains central laboratories at Sault Ste. Marie (built by the Province of Ontario and staffed by the Federal Government) for intimate studies of the life history, habits and diseases of forest insects, and special measures which may be taken to control the various pests. The facilities of the Dominion Parasite Laboratory at Belleville are also available for the breeding and storage of parasites, and services of that nature. Laboratories to deal with local problems are maintained in British Columbia, Ontario and the Maritime Provinces. Only Quebec Province maintains a Forest Entomological Service, with its own laboratories, for its local problems. There is also close co-operation between the Quebec and Dominion Services.

The Forest Entomological Service was treated as a Cinderella until three years ago, when the seriousness of the budworm epidemic focused attention on its inability to cope with the problems which had arisen. Up to last year forest entomologists, who in addition to ordinary university status must also possess post-graduate degrees, were paid considerably less than the present earnings of most pieceworkers on Ontario woods operations. The result was a critical scarcity of technical personnel. Salary rates have now been adjusted so as to be reasonably attractive, and it is to be hoped that the difficulty in obtaining and holding technical staff has been mastered.

A national Forest Insects Control Board, with federal, provincial and industrial representation, serves as a co-ordinating agent. Giant strides are being taken in collecting and studying data for the purpose of preventing the destruction of forests by insects.

I recommend the closest possible integration and widest expansion of federal and provincial effort toward the solution of forest entomological problems. It goes without saying that such co-operative effort and exchange of information should be extended to interested organizations in the United States.

CONTROL OF PATHOLOGICAL CONDITIONS

Forest pathology deals with diseases of trees. We know little about the reasons why a species growing on one type of soil remains sound and healthy but on another soil develops red-heart and becomes defective comparatively early in life. We know equally little about rates of deterioration of logs or bolts under varying condition of storage, or other like matters.

Trees which have grown side by side since the sapling stage react differently to changed conditions; one dies, the other thrives. These and many similar questions are begging for solution. White pine blister-rust, a fungus disease which must have currant or gooseberry bushes to complete its life cycle, threatens the white pines of Eastern America. The only known method of defeating its ravages is to remove the currant bushes, a costly and tedious process. Intensive study should be devoted to a simpler and cheaper safeguard for this very valuable species.

The total number of forest pathologists in the employ of the federal and provincial governments in Canada has never exceeded a dozen, too few to cope with the diverse and complex problems of Canada's forests such as those mentioned above. I do not know of any receiving more than $300 per month, and the general average is much below that figure, despite the attainment of Master's and Doctor's degrees.

Like entomology, forest pathology is essentially a federal problem, but the provinces own 90 per cent or more of the forests and the pressure for accelerated activity in forest pathology must come from the citizens concerned. In case the argument may be put forward that, as the provinces own the forests and derive the revenue therefrom, the problem is essentially provincial, I point out that federal income taxes paid by forest industries alone amount to several times the revenues received by the provinces in the form of dues and provincial forest taxation generally.

CONTROL OF FOREST FIRES

What should be done to control forest fires in this Province was discussed for several decades before any realistic measures were taken to meet the challenge. Early action was practically all devoted to the suppression of fires rather than to their prevention. With the passage of years, technique and equipment have improved, as has also the statistical data concerning areas, locations, causes and costs of fires in effort and money. Fires over 500 acres in extent which have been reported and mapped in recent years are shown on Map No. 9.

One tremendous advance was made just after the First World War when the Ontario Air Service was founded. Ontario is unique amongst Canada's provinces in the distribution of water areas sufficiently large for the accommodation of pontoon-equipped aircraft, and in the absence of high mountains. Hills of medium height exist mainly along the north shore of Lake Superior and in the Algonquin Park region. Conditions are, therefore, ideal for using aircraft both for detection of fires and for moving men and supplies to fires quickly. This is a tremendous factor in fire fighting, as minutes saved in delivering men and equipment in the early stages of a fire can save hundreds of man-days later. Fires starting during the afternoon can usually be controlled and extinguished during the evening of the same day and the early morning of the next, when more favourable humidity conditions are likely to prevail.

As mentioned earlier, Mr. E. W. Basset of the British Columbia Forest Service accompanied the Commission staff from mid-May until late July, and in writing this chapter I have drawn largely from his report to me. His report is highly complimentary of the fire-protection personnel of the Department, an opinion with which I agree.

SELECTION OF PERSONNEL

The necessity for the selection of capable junior personel is stressed, as in the normal course of events they rise to senior positions. **I am convinced that educational standards for applicants must be set and maintained. Appointment should be on the basis of both written and oral examinations, supplemented by brief tests for mental alertness and aptitude.** Selection by such means would eliminate the employment of misfits and prevent waste and the loss of money and timber through costly mistakes later on. The days have passed when chances should be taken in appointing Rangers and Deputy Rangers. Relationship to somebody already in the service, or industrial or political pressure, should have no bearing in the selection of the guardians of our forests. Only men best suited for the work and who have in addition a desire to make it their vocation should receive consideration for posts which are likely to lead to permanent employment.

As mentioned on page 97, salaries and working conditions generally must reasonably reflect the conditions prevailing in industry or else it will be impossible to interest the proper type of personnel. **Once selected, they should be eligible for year-round employment with the normal civil service security, retirement benefits, etc., after an appropriate period as temporary employees.** The detrimental effect on morale, as well as the unfairness, of maintaining employees year after year as "continuous temporaries" is evident and the practice should be eliminated. In 1946 there were 448 continuous temporaries, many with terms of service ranging up to a quarter century or

more. During the past year considerable progress has been made in eliminating injustices of this nature, but much more remains to be done.

The new Ranger School at Dorset, many years overdue, should make possible big improvements in the training of ranger personnel, compared with the former haphazard system of apprenticeship, where the interest taken by Chief Rangers and Rangers in training new men, and their ability to impart knowledge, varied widely and, in some instances, was entirely lacking. **Instructors should be selected from amongst the better administrators, but ability to instruct is of even higher importance than administrative ability. Training should be gradual, with frequent refresher courses to maintain interest and to keep the ranger personnel up-to-date.** It is realized, of course, that it will not be possible to obtain immediately all the personnel who are needed and who possess the desired standards of education, ability and alertness; also that training methods should necessarily be sufficiently flexible to provide for different types. **A start towards the selection of the highest type of young man available should be made forthwith.**

I caution against a tendency toward making the Ranger School an adjunct of the University, rather than of the Department of Lands and Forests. Its prime function should be and remain the training of scalers, inspectors, cruisers, etc., until such time as the recommendation I make concerning this matter in Chapter XIV is adopted.

ORGANIZATION

In Chapter VII, I have indicated what I believe to be a necessary and desirable change in organization and chain of responsibility, providing an Assistant Deputy Minister in charge of each Region, with District Foresters and an Air Service representative reporting directly to him. I consider the present alignment of duties between Regional and District Foresters to be insufficiently defined, wasteful of administrative material, and unproductive of the ultimate in co-ordinated effort.

Chief Rangers and other field staff should and must report directly to the District Forester, who should be provided with Assistant Foresters to whom he can delegate certain duties and one of whom can take his place when he goes on field trips. District Foresters, like many other administrative officers, have a tendency to become "desk-bound", particularly since the recent addition of Fish and Wildlife Division responsibilities. This tendency must be resisted and the District Forester should spend more than half his time in the field. **I recommend that in each District there should be at least three Assistant District Foresters, each in charge of a branch of the District activities.** District staff in charge of accounting and of fish-and-wildlife work would not necessarily be foresters.

The present field organization of Chief Rangers and Deputy Rangers is satisfactory, but their numbers should be increased as outlined under the next heading. There is at present a clash between duties relating to fire protection and the scaling and inspectional duties of Rangers and Deputy Rangers. This should be eliminated, as routine scaling or inspectional work must not be allowed to interfere with the efficiency of fire protection. Similarly "duties" in connection with guiding or other tourist activities, no matter how important the guest may be, should be carried out by personnel who are not connected with

fire protection. **In other words, during the fire season, fire protection must come ahead of all other duties.**

I believe it would be beneficial to the service to exchange forest protection and forest inspection personnel between the various forest districts and ranger districts, from time to time. It would have a broadening effect that would ultimately prove very valuable to the service.

The proposal in Chapter VII, in which it is recommended that the Air Service in the region should be under the Assistant Deputy Minister in charge, will assist in welding the Forest Service and Air Service groups more closely together.

FIRE-CONTROL PLANNING

Some compromise must be made concerning the intensity of fire-control decided upon. It is, of course, neither feasible nor possible to prevent all fires, but it is possible to decide what measures are likely to prevent fires burning over more than a calculated percentage of any given area, even in a bad year. Having decided on the percentage, control measures toward that end may be formulated.

With such a wide range of forest types, topography and climatic conditions, fire-control planning must be tailored to fit the individual Districts. This can best be done by making the following basic surveys in each District or Region involved.

(1) Fire-History Study

The location and intensity of risk may be determined by means of plotting all fires and their causes over a given period, at least a decade. Trends must be checked to ensure that some transitory and non-recurring influence may not be overweighted.

(2) Fuel-Type Study

The extent and intensity of static fire-hazard should be mapped and evaluated in conjunction with the fire-history study above, so that tower locations and detection services generally may be planned to best advantage. Such studies may involve abandonment or relocation of existing towers.

(3) Access Survey

A map showing all roads, trails, boat-channels and aircraft-landing sites should be prepared in conjunction with item (2) above, to indicate less accessible spots where an excessive amount of time may be consumed in getting personnel and equipment to a fire. Further development may then be undertaken of those roads and trails indicated as being necessary. This survey will also be useful in arranging strategic location of seasonal personnel, equipment-caches, field headquarters, etc.

More imtimate and detailed studies of visibility from individual tower sites, locations for radio and telephone communications, tool-caches and ranger stations, must be superimposed on the above surveys

so that a proper balance of personnel and equipment, commensurate with needs, may at all times be maintained.

Fire-control plans developed as above should not be static. They will require constant alteration due to changes in fuel-types resulting from forest growth, cutting or other influences, such as shifting centres of population, changing modes of transportation, etc. For instance,

INCIDENCE OF FOREST FIRES

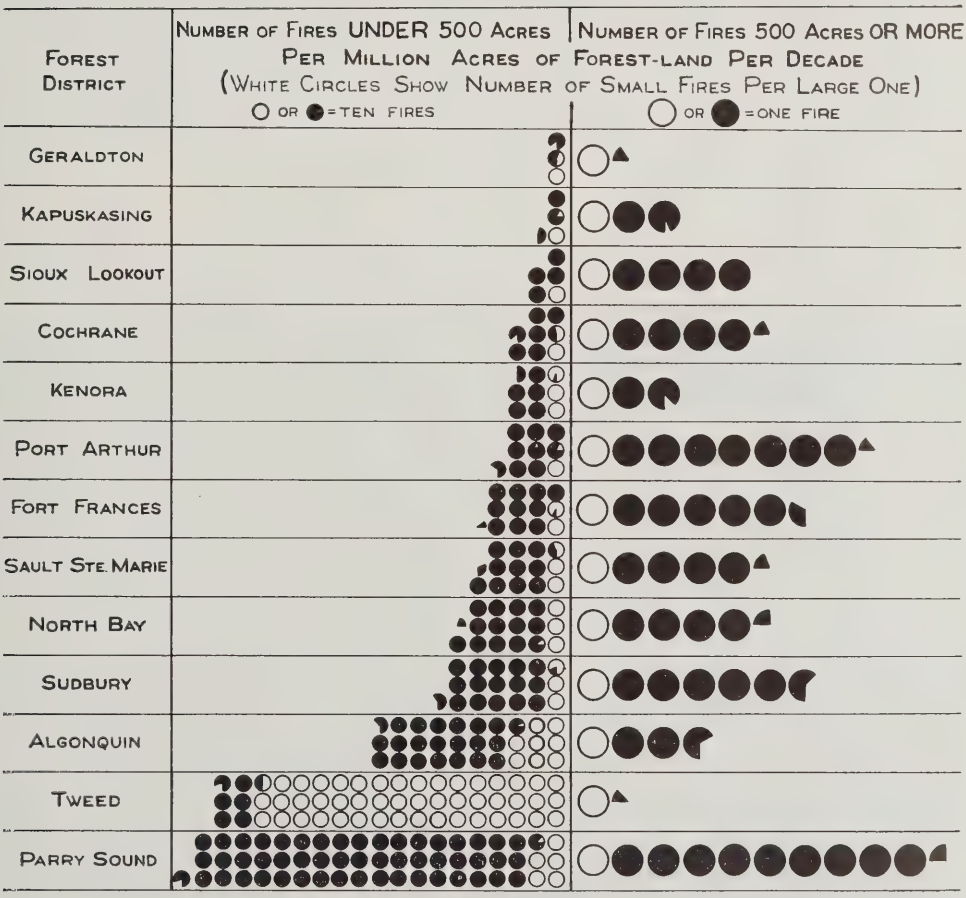


Chart showing the comparative incidence of large and small forest fires in the Forest Districts of Ontario.

the use of helicopters may radically alter the present system of detection and communications, eliminating many towers and telephone lines.

FIRE SUPPRESSION

Fire-suppression tactics and effort, wherever observed, were prompt and efficient. Within their limitations, only two out of all the Chief Ranger Divisions visited failed to function extremely well under the pressure of fire conditions and in those instances the performance was fair, not bad.

It is difficult to make a true comparison of the efficiency of fire fighting in the various Districts because of inherent differences in fire hazard existing between them. In the chart (p. 123) an attempt has been made to allow for these differences by reducing the statistics to a uniform basis of a million acres in each District for a period of ten years. Assuming equal efficiency of the personnel in the several Districts, the chart shows that proximity to settlement, with good roads and communication systems, permits of early detection and prompt control of fire as compared with conditions in remote Districts where means of communication and transportation are inadequate. It will be noted, for instance, that in the Tweed District of Southern Ontario there were 475 small fires for each fire which extended over 500 acres, while in the Sioux Lookout District, one out of every eleven fires exceeded that area. The fact that a larger number of people were in the woods and started far more fires in the Tweed District was offset many times over by the increased efficiency in handling fires in the early stages, made possible by quick detection and easy access to them with men and equipment. This is a convincing argument for more roads in our forests.

Spruce reproduction on an unburnt cut-over area. This illustration and the one on the opposite page are of adjoining areas separated only by a road which served as a fire-break.

Among the most disastrous of forest fires are those in cut-over areas even though no timber is destroyed. Such fires wipe out advance growth and so impede the reproduction of desirable species that the areas remain commercially unproductive for generations.

There are a few weaknesses in the fire-protection system to which I would draw attention and which are sufficiently serious to require mention.

(1) There was no communication provided between aircraft and ground crews on fires, except by direct contact, which was normally difficult to achieve as well as wateful of time. **Some radio contact, even of the "Walkie-talkie" type, by which the pilot could talk to the Ranger in charge, would often save hours in delivery of supplies and equipment to the site.** It would also permit the pilot to advise the ground crew of developments in the fire-spread, or possibilities of attack not readily apparent from the ground. Different wave lengths from those normally used may be necessary, but the possibilities well justify serious action toward implementing the proposal.

(2) **Suppressive action, in several areas noted, would be speeded by the building of access trails or roads.** The use of aircraft has a tendency to lull protection personnel into a sense of security which may not be justified in these areas. **Development of north-south highways in all the major watersheds would be a tremendous help in fire protection, as well as in implementing sound forestry practice.**

(3) The number of well trained personnel available were not sufficient to supervise the number of men involved on large fires. It requires one trained man for each five to seven fire-fighters scattered through the woods, if effort is not to be wasted and time lost. **Pre-season training schools, operated under District personnel who have taken the Ranger School course, would help. Every member of the District staff should have such instruction and it should be extended to selected individuals from the comapnies**

operating in the District; it should also be made available to the general public, particularly to those who might be called upon to assist in time of fire.

(4) The parachuting of supplies and equipment should be studied. It might require structural alterations to aircraft or even the adoption of other models, but it has distinct possibilities. **As soon as more practical models of helicopters are available at prices which are not fantastic compared with the service they can render, I recommend experimentation to determine their suitability for the twin objects of detection and the delivery of men and supplies to the scene of a fire.**

(5) **The adoption of a fire-danger rating system would, I believe, prove beneficial.** There are several good systems which might be used. One developed by the Dominion Forest Service is practicable and reliable. **I believe that adjustable signs made to resemble thermometers or barometers would be of very material benefit in making travellers conscious of the hazard. They would indicate the degree of the existing fire-hazard and should be strategically placed on roads in forest areas, giving at all times the correct information in a striking manner.**

EQUIPMENT

The fire-fighting equipment of the Department of Lands and Forests was found to be uniformly well maintained and in good repair. Tools and equipment were generally suitable for the service required, though in some cases they might be considered inadequate to meet the maximum emergency needs of the particular area served. Some lack of balance was noted in a few cases in that the Chief Ranger might be short of small and inexpensive equipment, while a rather expensive type of watercraft was available for water transportation when required. In at least one instance a fire within a couple of miles of Ranger Headquarters could not be reached by the forest personnel for several hours after it had been detected, because the only water transport available (canoe and outboard motor) could not be used in very rough water. **I recommend that all ranger stations be equipped with boats seaworthy for any weather which may be encountered on the body of water involved.**

There is a real need for central equipment warehouses where reserve pumping equipment, hose, outboard motors, etc., can be serviced and stored. One central warehouse in each of the three proposed Regions would probably suffice. It would reduce the over-all amount of equipment needed in the Province and would provide for quicker and better repairs in shops properly fitted and staffed for such service. The rapid and efficient distribution of extra equipment to areas where the emergency is greatest would also be facilitated.

The necessity for a serviceable, light-weight, pressure-type power pump is indicated for initial action on fires. Present equipment is good, but a pump of greater portability would prove extremely beneficial in the early hours or minutes of a fire. I recommend that, if suitable equipment is not already manufactured, the Research Division develop a pilot model for manufacture commercially.

The usefulness of bulldozers in developing fire guards is now recognized. **I am convinced that a couple of heavy machines and one light machine could be kept steadily in operation in each District during the summer**

months, developing fire guards, trails, etc. When a large fire develops, they would sometimes prove invaluable in quickly clearing a guard in the path of the fire.

Automotive equipment in practically all districts was old and generally in poor state of repair. Departmental mechanics observed working on vehicles had poor facilities and did not appear to be particularly well trained. **I recommend the study by the Department of the proposal that a well equipped and well staffed mobile repair shop visit the Districts periodically to overhaul their vehicles. It has possibilities of sound economy.**

In some Ranger Divisions, members of the administrative staff did not own cars and, as a result, the service suffered to some degree. It has been argued that Departmental cars lead to abuses but it may equally well be argued that allowances for privately owned cars on a mileage basis lead to similar abuses. If such abuse exists or is feared, then the supplying of suitably marked light delivery vans, instead of cars, for Chief Rangers and lower grades would seem to eliminate the problem. For senior personnel, Departmental cars seem to be justified and desirable. I repeat, the abuse of mileage allowances is just as feasible as the misuse of Departmental vehicles.

INSTALLATIONS AND FOREST IMPROVEMENTS

Existing field installations at Chief and Deputy Ranger headquarters are generally of a satisfactory type. There is, however, a need for an expanded building programme, particularly in the east and south of the protection area. The detail of such needs would entail an intimate study which would best be carried out in conjunction with the recommendations in the preceding paragraphs on fire-control planning.

Regional and District headquarters are generally poorly served in matters of office accommodation and warehousing. Sault Ste. Marie, Geraldton, Kapuskasing and Pembroke are outstanding examples. From the standpoint of esprit de corps and efficiency, as well as Provincial prestige, **I recommend improved accommodation at most of the District Headquarters.**

Duplication of services is apparent between the District staffs and the Air Service in some areas. I believe the proposed set-up will tend toward more of the family feeling, and sentiments of envy or isolation will be dissipated.

Field telephone communications were not always adequate, or in good repair, although they gave evidence of having been well installed initially.

In a few instances, radio installations were inadequate, due to outmoded equipment. As an example, four lookout towers were keyed to a fifth tower, presumably all on the same frequency. In practice, due to age, it was not found possible to retain the sets on their exact frequency so that the key tower had to arrange time schedules for each of the others. As a result, a fire detected from a subsidiary tower just after its schedule, could not be reported for almost an hour.

The existing system of fire towers is measurably inadequate and there is a need for roughly 100 more towers in the area at present protected. These have been included in District recommendations for several years but have not been built for budgetary reasons. If protec-

An open refuse burner at a sawmill. These are common in the Hearst-Cochrane area and are a menace to the surrounding forest and evidence of poor utilization.

tion is to be as good as it can be, they are necessary and I recommend an expansion of the system in conformity with my remarks on fire-control planning.

In connection with field installations, it might not be inappropriate to mention that the method of budget allotments could be improved. Each District has construction plans of varying priority. The sum allotted to a District may not be sufficient to carry out a major scheme but it may be used for a minor project. **Therefore, if estimates must be cut, the Regional authority should be given the greatest freedom, within his area, to utilize the allotted funds for major projects, rather than have them dissipated on minor developments.**

FIRE PREVENTION

Some of the most effective fire-prevention effort that can be undertaken lies in the field of public relations. I am recommending elsewhere a Division of Publicity and Education and I foresee a widely enlarged field for it in providing lectures, motion pictures and radio programmes for schools, service clubs and the public generally. Publicity campaigns in the daily press and periodicals should be unremitting. I believe a fruitful public relations field might be cultivated by widely publicized invitations to travellers in our forest areas to visit lookout towers, ranger stations, air bases, etc., so that they may gain a wider understanding and interest in the work of the protection service. Such action

by the Department in the case of an excellently maintained tower at Parry Sound has been the occasion of much favourable comment and interest.

The law regarding fire prevention specifies that areas surrounding logging camps shall be cleared of inflammable material for a radius of 300 feet and this has been widely observed in the case of most large permanent or semi-permanent camps. There are many notable exceptions in the case of smaller camps and temporary camps. I have seen summer logging camps with clearing debris within 20 feet, but with no spark arresters on smoke pipes and no fire-fighting equipment on the premises. **More specific regulations requiring a clearance around all camps, spark arresters, fire-fighting equipment to be maintained on site, etc., should be provided and fully enforced, the penalty being the closure of the camp unless deficiencies are corrected within 48 hours after notification.**

Hazards from cutting operations must be minimized. The period of hazard could be lessened by lopping limbs from the tops and spreading the brush so that it will lie close to the ground and disintegrate more rapidly then it does at present. Where summer cutting or other summer operations are carried on, there should be a fire pump with at least 2,000 feet of hose for each 50 men or fraction thereof on such operation, together with shovels, pails, mattocks, etc., all maintained in serviceable condition. All foremen and key men of the companies concerned should be required to take courses in the operation of such equipment and in fire fighting generally. Such courses could be given by District Ranger personnel prior to the fire season each year.

CLOSURE OF FORESTS IN TIME OF HAZARD

In periods of extreme hazard, at the discretion of the Regional executive, the forests should be closed to public travel. Such action would be wise and, in addition, would be good propaganda in making those affected more conscious of the importance and value of their forests. I believe such action would be cheerfully accepted and aided by all except those few who create the need for it.

A fire-danger rating system mentioned earlier would serve a most useful purpose if the closure recommendation is adopted. Indicators placed along roads could be graduated with markings and have a sign warning that if the hazard reached a certain graduation, travel would be prohibited. Closing of forests generally would create the need for some park areas being set aside to which tourists and others could be diverted during the period of restricted travel.

EXTENSION OF PROTECTION AREA

On the eastern side of the Province, fire protection services generally extend northward to the area where timber of economic value ceases. Moving westwards, however, there is a gap between the protected area and the economic timber-line which widens perceptibly until, in the more westerly portion of the Province, it extends over a distance of a couple of hundred miles.

Disastrous and repeated fires have removed the timber and much of the soil from vast areas within this unprotected timber zone. The lack of transportation systems will probably prevent utilization of much of the timber for

many years, but the area holds vast potentialities as an extension of the Red Lake and Pickle Crow mining developments and many prospectors are already actively searching for minerals there. One mine is now operating in the Berens River district. Timber of a size suitable for mining and construction is growing on the unburned patches, northward to the Severn River and eastwards to include Trout Lake, Winisk and Attawapiskat Lakes. (See Map No. 7.)

When mining developments are active anywhere in this region, the available timber will be worth many times the value of similar timber to the south of it in regions having transportation systems. **I therefore recommend the extension of the protection area northward to the economic timber-line. This will require not less than two extra Chief Ranger establishments with air and radio coverage. The extension northward of existing Chief Ranger establishments to tie in with the new ones should also be provided for.**

FINANCE

Forest protection costs averaged slightly over $1,000,000 per year from 1941 to 1944 inclusive. The Air Service during the same period averaged slightly under $300,000 per annum. Both figures are based on statistics in departmental annual reports for the period, with allowance made for receipts. Although the Air Service does not function under the Division of Forest Protection, its existence is primarily for forest protection; its cost, therefore, should be allowed for in any consideration of the over-all cost of the Division. With post-war increases in wages and salaries and a necessary expansion in services, these costs can only increase, and for 1945 amounted to $319,000.

Annual recipts from fire tax have averaged less than $450,000 over the above-mentioned years, although an exceedingly high proportion of the expenditures are incurred on the areas held under license, agreement, permission or permit. It would be very difficult to get an exact breakdown of expenditures for fire protection applicable to those parts of the Crown domain so held. It is, however, apparent to any unbiased observer that the concentration and cost of protection service on these areas is much greater than on the areas not under some form of license or agreement. I estimate that upwards of two-thirds of all expenditures for fire protection and suppression are made in connection with the areas so held, yet the annual fire taxes on these areas bring in only roughly one-third of the costs. **I recommend that a definite breakdown of expense on leased and unleased lands be made, and that holders of licenses, agreements, permissions or permits, pay the full cost of the forest protection services rendered on the areas covered by their leases from the government.**

One fatal error which must be guarded against at all costs is a repetition of that made in the depression years when, as an economy measure, the detection and suppression staff was reduced below the minimum recommended by the Forest Protection Service. Fires, which should have been extinguished in incipient stages, got out of control and the cost of fighting them far exceeded the savings presumed to result from the wages of personnel dismissed; in addition, many square miles of timber were lost.

The cost of forest protection should be considered as the premium paid for insurance, with payments provided for just as carefully as are the payments on

fire-insurance policies generally. Such premiums are not usually reduced as a measure of economy and, if reduced, can only result in increased losses when a fire does occur. A formula adopted by some forest protection experts is that the total of losses caused by fires plus the cost of fire protection should be a minimum, when averaged over a reasonable period (i.e., valuation of losses + cost of protection = minimum). In other words, increasing expenditures on protection are justified up to the point where they are no longer offset by reduced losses.

It is possible that reductions in cost might be achieved and efficiency increased by a closer co-ordination of government and industrial effort. **I recommend a serious study of the possibility of the government undertaking all detection work and possibly the communication services, with the companies responsible for all ground services (except possibly communications). This would fit into the scheme outlined in the last chapter of this report and would make forest protection a function of forest management, which it truly is. Idle or partially idle ground forces would be largely eliminated in low-hazard seasons, and company employees could be fitted into the fire-fighting picture more readily than at present. This latter item is important, as it was observed this season that pieceworkers earning high wages were reluctant and unsatisfactory workers when conscripted as fire fighters at approximately one-third the wages they were earning as pieceworkers.**

Suggestions made for the betterment of the forest protection service must not be construed as criticism. I believe that the Province is exceedingly well served by its protection service and that more could not reasonably be expected for the monies expended.

As a final word of caution, I would suggest that the tendency toward over-reliance on air service, at the expense of ground-force strength, must be carefully weighted in considering future development and expansion. Wars cannot be won without infantry to mop up and consolidate the gains of other arms. Few fires can be controlled without ground forces, who are the infantry of the forest service.

CHAPTER XI

Provincial Air Service

The Provincial Air Service is a separate Division from that of Forest Protection, although it might be argued that it should form a part of that Division because its primary function is for the detection and suppression of forest fires.

The Air Service, however, provides flights for the Divisions of Timber Management and Fish and Wildlife, sometimes for the Provincial Police or the Department of Health and, in areas where commercial air services are lacking, it has supplied transport for industry. A number of mercy flights are undertaken every year to carry critically ill or injured individuals to hospitals or for surgical services.

It commenced operations in 1924 and its headquarters has always been at Sault Ste. Marie, because the swift-flowing waters of the St. Mary's River furnish open water for aircraft returning to base after lakes may be frozen throughout all the northland. For the same reason, it permits the assembling and testing of aircraft early in the spring so that they are ready to proceed to their destinations as soon as there is open water in the northern lakes. All winter-storage and annual repairs and overhaul work are carried out at Sault Ste. Marie.

In 1946, the service consisted of 29 aircraft, 22 of which cannot be considered modern. The fleet is now composed as follows:

12 Norsemen
9 Stinsons
1 Canso
5 Moths
1 Fairchild "71"
1 Buhl

Of these (20 of which are equipped with two-way radio), 27 were on fire-fighting service, with the Canso mainly used for exploration and insect-control experiments. The Buhl is utilized in the sulphur-fume investigation in the Sudbury area.

The Norsemen aircraft are extremely sturdy and reliable and well adapted to the service required of them. From the experience to date, I am convinced that a wise choice has been made. There does, however, seem to be a field for a cheaper aircraft with corresponding lift to provide facilities for parachuting supplies and equipment to fire fighters. Such an aircraft has not yet appeared. Speed is not the governing factor in fire detection and fighting. A difference of a few miles per hour is not of great import on a large majority of the flights undertaken.

One of the drawbacks of the Air Service is that it has, as yet, no reserve of aircraft and when one is out of service for repairs, there is no machine available to take its place. In such instances, coverage is normally provided, at least in part, from air bases in adjoining Districts.

I believe that a wider use of aircraft on winter administration and inspection of operations would be profitable and would measurably assist in bridging the gap between staff available and staff needed. The Chief of the Division points out, however, that aircraft so used would not be available for proper overhaul before the summer's work starts and, in addition, flying hazards are somewhat higher in winter than in summer. An aircraft lost on winter operations would therefore leave a corresponding blank in forest protection the following season and it is essential that fire protection should receive priority.

I recommend, therefore, that the fleet be built up to a point which will permit of a surplus available for proper rotation for repairs. This would remove the present objection to winter flying which would be beneficial, not only for timber management, but also in the control of poaching activities.

Due largely to the nature of government accounting practices which deal with cash transactions rather than expenses, the comparative costs of operating the different types of aircraft have not been computed, or for that matter, the the cost of operating any aircraft. The paying out of money for purchases of new equipment in any year is not necessarily an expense in that year and, conversely, an expense such as depreciation may be incurred without paying out any money. As a result, the accouts for any particular year are not necessarily a reflection of the actual cost of the year's operations. This is not a critism of the Division of Accounting, who are giving accurate reports of the expenditures and receipts of the Air Services as required by the system of accounting in effect. **It does however, point to the need of a more comprehensive system of cost accounting within the service.**

In 22 years the service has operated ten different types of aircraft, and a wealth of valuable data could have been made available had a cost system been in effect similar to that used by commercial air transportation companies. However, the net expenditures for the service distributed against the various air bases has been the type of information required and supplied.

In the past, aircraft have been completely written off in four years, although some of the Moth machines are now sixteen years old and ten years would seem to be a conservative period on which to base depreciation charges. Tax is paid on all gasoline used and the Department of Highways received revenue amounting to over $10,000 per annum from this source for 1945 and 1946, which amounted to more than $1.25 per hour flown during the period. Commercial aviation companies do not pay tax on gasoline used in aeroplanes.

As there are no figures available which will give the operating costs per hour of any type of aircraft used, comparisons with similar costs for aircraft used commercially cannot be made. However, an analysis of accounts 1944/45/46 indicates the average stand-by cost per aircraft, including all types except the Canso, as amounting to $53.03 per day. This includes all charges except those for gas, oil, etc., which show annual costs increasing from $5.23 per hour in 1944 to $6.93 per hour in 1946, due partly to an increase in the number of heavier aircraft. Naturally, there is a wide difference between average costs and individual costs, as the heavier Norseman, with many times the weight and power of the Moth, uses more fuel per hour of flying time.

Reasonably accurate cost figures should be developed for the various types of aircraft so that proper charges may be made to other Depart-

ments of the Government or to commercial firms who use the service from time to time, and also to meet the criticism sometimes expressed that the Department could purchase flying services more cheaply than they can provide it themselves.

It would be erroneous to make a straight comparison of hourly charges of commercial air services and hourly charges for the Provincial Service aircraft. The value of having suitable aircraft, properly distributed, instantly available and under Provincial control, is a dominating consideration which must not be overlooked. This factor may be regarded as insurance without which our forests would be in a more precarious state than at present. A published commercial rate per hour for flying does not mean that there will be an aircraft available at the right place whenever called upon for either detection or suppression service.

A minor matter of economy would appear to require study. I noted special flights made to deliver mail and groceries to towermen. The cost per pound of delivering groceries in this manner seemed to be out of proportion to the services rendered. It may be that I have failed to perceive sound reasons for the action, which is not confined to isolated cases; but I suggest the serious consideration of land or water delivery of mail and groceries to isolated posts. Naturally, it is sound economy to deliver such material on regular flights and no criticism is directed against such action.

As mentioned in Chapter X, I recommend experimentation with helicopters as soon as their performance and cost justify such action. I believe there is a real field for their use in delivery of men, equipment and supplies, from the point where pontoon-equipped aircraft can deliver them, to the site of the fire. Their possibilities in detection activity may also justify their widespread use.

At all times during the five months in which the Commission staff made wide use of the Air Service, there was not a moment's delay because of unserviceable aircraft. Pilots were invariably obliging and efficient and, on every flight, reached their desired destination. This is a record of which any service might be justly proud.

In Chapter X on Forest Protection, I warn against a possible tendency to rely too fully on aircraft. Their field lies in detection and quick delivery of men and supplies to the vicinity of a fire. If aircraft cannot put down in an area, then there must be trails and other land communication systems provided for ground forces. Such areas exist and I caution against the possibility that they may not receive the attention they deserve because of over-reliance on aircraft.

I have also recommended that aircraft in the various Regions suggested should be under the control of the Assistant Deputy Minister in charge of the Region, who would have a representative of the Air Service as a member of his staff.

CHAPTER XII

Fish and Wildlife

The Division of Fish and Wildlife was transferred to the Department of Lands and Forests only during the past year. I believe that the transfer was a wise one because many phases of the work of the new Division may be co-ordinated with the work of the Department without serious dislocation or large additions to staff. In some areas it has thrown a considerable administrative load on the District Foresters and has, to some extent, interfered with their field work amongst, and personal contacts with, forest operators and owners. Clerical staff could be added to District Offices to handle office routine, thus releasing District Foresters and technical personnel generally to function in their proper sphere.

Testimony given at the public hearings indicates a tremendous lack of fundamental data concerning populations of the various species of birds, fish, and animals and the causes of their migrations and serious epidemics amongst them, or other reasons for the diminution in their numbers.

It is certain that many of the streams in Southern Ontario which are not now inhabited by any type of useful fish, once teemed with game fish of various kinds, including the land-locked salmon. Stream pollution and extreme changes in water level have been largely responsible for this condition and, in many cases, spawning beds have either dried up in the summer or have silted over because of erosion, on the higher stretches of the steam, occasioned by freshets; also the removal of timber has allowed water temperatures to rise to points which game fish will not tolerate. A return of good fishing on our many streams would not be the least of the blessings conferred by a wide scheme of reforestation and restocking. Not only would fish then reappear, but game birds would return. The addition of fish and game birds would add to the recreational value of the countryside and make a worthwhile addition to the larders of those who have the opportunity to fish and hunt.

The reduction of forests to less than 10 per cent of the total area of Southern Ontario has seriously affected both bird life and fish life and it is most unlikely that there will be any considerable improvement until the area of forest is increased on a vast scale. There will not be a satisfactory balance until 25 per cent or more of the land is again under forest growth.

Big game in Ontario consists of the black bear, white-tailed deer, moose and caribou.

Black Bear

Black bears are still abundant, even to the point of being a nuisance.

Deer

Deer are abundant in many regions and, although conflicting evidence was presented before the Commission, the testimony of scientists who had given the

subject most study left little cause for worry concerning the deer population. Local scarcity was reported but this seemed to be the result of over activity on the part of hunters in these immediate localities.

There were 55,000 deer licenses issued last season in Ontario—a tremendous increase which may necessitate remedial action if it continues to grow. Evidence given by a member of the Ontario Federation of Anglers and Hunters blamed outfitters for the local disappearance of game in certain areas. His contention was that such areas could not support forty or fifty new hunters within a small radius every week or ten days during the open season.

Deer have proven that they can live and multiply close to or within settled areas. Beyond the possibility that their numbers may be seriously depleted by slaughter on a large scale by too many hunters, their future seems reasonably well assured.

Arguments were presented for and against the passing of a "buck law", which would for a time prevent the shooting of any deer except bucks over one year old. The need for such action is not clear, though it would be a conservation measure of very considerable importance because many hunters would never get a deer if they had to be close enough to it to establish beyond doubt whether or not it had antlers. It was argued that many does would be shot and the carcasses left concealed in the woods when the sex was established and the legal implications realized. It was also argued that the proper biological balance would be upset with a consequent harmful effect on the health of the deer population.

It was argued, I believe with some justification, that deer should be killed in reasonable numbers in order to prevent an expansion of population beyond the capacity of supporting feeding areas. Where numbers increase beyond the carrying capacity of any region, disease and a decrease in the average size of animals may be expected, in addition to damage to forest growth.

The matter of suitable feed and feeding areas has not been very intimately studied and conflicting views are held. It is rather apparent that many deer die in yarding areas late in the season, possibly from starvation occasioned by the disappearance of browse. What percentage of deaths occurring in this manner is amongst the mature specimens, which would normally die of natural causes, has not been established, nor has it been established whether it is lack of initiative or lack of ability to travel through deep snow in their weakened condition that prevents migration to other feeding areas. The summer feeding of deer presents no problem. The destruction of winter-feeding grounds by fire or unwise exploitation may seriously affect the situation in any locality. One scientist gave the following testimony: "The best possible environment for deer is provided by forests that are well utilized for wood, where slashings are common and young stands well interspersed . . . the production of a crop of white-tailed deer in Ontario is an easy matter. The control and supervision of the large and increasing number of hunters is the biggest problem in deer management."

The use of hounds in hunting was condemned by one group and defended by another, with mention by one witness of humans who imitate dogs and follow the trails "giving tongue" in a locality where hounds are prohibited—a practice which gives promise of the development of a new seasonal forest industry. The evidence presented is far from conclusive. Prohibiting the use of hounds would

certainly reduce the chances of older and less mobile huntsmen shooting their deer. I am not venturing to express an opinion concerning the cruelty to the deer. Some compromise measure, such as hunting with a different type of dog which would desist after a 15- or 20-minute run, would seem to hold possibilities.

There are several abuses of the present game license procedure which could be corrected comparatively easily, thereby diminishing the drain on deer in some of the areas which are intensively utilized for hunting. "Dated" licenses, expiring in a given time, would prevent the use, in more southerly localities, of licenses purchased for the northern localities where the season opens earlier.

The widely practised custom whereby a guide shoots deer for any or all of the members of a hunting party should be abolished forthwith. This could quickly be accomplished by printing one section of the license in the form of an affidavit on which the holder of the license would swear that he shot the animal to which the affidavit must be attached. Violation should render the signer liable for perjury and, in the case of a guide, to confiscation of his license without right of renewal for a period of three or more years.

The above suggestion would prevent the practice of the best shot in a hunting party shooting the deer for those not so skillful. There is really little reason why the possession of a deer license should entitle any citizen to receive a deer, whether or not he has the skill to shoot one himself. Under the circumstances this custom, which practically assures a license holder a deer, makes venison a very cheap source of meat and, in my opinion, is one of the main reasons for the tremendous increase in the number of licenses issued. If it becomes necessary to reduce the deer population, they might be slaughtered commercially and the venison sold to the public, as is the case when buffalo herds in Western Canada are reduced. By this means, the opportunity of obtaining venison would be much wider than is now the case.

It was generally agreed that no shooting should be done on, or within 100 yards of, any Provincial or county highway.

The issuance of a license to an individual should obligate him to fill in a section, which would be returned to the Department, giving the date and place where a deer was shot and its sex, age, weight, condition, etc. Statistics of this sort would be of great value to the scientists studying game problems.

Much waste of venison could be eliminated if a pamphlet were prepared and distributed with each license, giving instructions on the preparation, care and handling of a deer carcass after the kill.

Representations were made that guides' licenses have been issued to unsuitable and untrained individuals, sometimes known to be poachers. It would seem that an applicant should be vouched for by some official or a game association with knowledge of the applicant's background, and unlikely to recommend unsuitable ones. Possibly the applicant should be required to pass an oral or written examination.

Moose

For a number of years, moose have been decreasing in numbers throughout Eastern North America and Ontario has suffered with the other regions. The reasons underlying the diminution in moose population are not yet understood, but it is certain that hunting them is only one of the contributing factors and

probably not the main one. Research as to the cause should be seriously pursued and remedial measures developed at the earliest possible date if this species, so enticing to hunters, is to hold its place in drawing tourists to Ontario. It is not necessarily because of advancing settlements and commercial enterprises that moose are disappearing. Experience with closely related species in Scandinavian countries and Finland indicate that they do not need primeval conditions to survive.

There is no question, however, that moose are much scarcer than they were in some of the areas in which I worked on surveys prior to 1914, and which were visited by the Commission this year. The relative influences of shooting, timber exploitation, disease, etc., in reducing the moose population are quite unknown but should be exhaustively studied in order to produce a solution to the problem.

Caribou

Caribou were once numerous westward from Lake Nipissing and northward practically to the timber line. Their partial disappearance has been much better understood and appreciated than in the case of moose. For winter food, caribou depend almost entirely on reindeer lichens which, after fire, take about 50 years to develop. A glance at Map No. 9 which outlines only those fires reported and mapped in recent years, shows how much of the caribou habitat has been rendered unfit for their maintenance. Fortunately a good nucleus for an increased population remains and, provided the species is given a chance, there is every hope that improved fire-protection will permit it to regain its place as an important game animal in this Province.

Partridge

Partridge, or grouse, of one kind or another are native to this Province. Although at present they are experiencing one of their intermittent "low" periods, which is of a particularly pronounced nature, they will no doubt again furnish good sport across the Province. It should be noted that the scarcity of these birds is just as pronounced in areas where shooting is not a factor as as in those areas close to settlements where scarcity is generally attributed to slaughter by sportsmen. At no point in the timbered portion of the Province did the Commission find any indication of an abundance of partridge.

Pheasants

Pheasants have been introduced in several areas and have proved that with winter feeding they can survive. They do not seem to be able to maintain their numbers without artificial aids and whether their propagation should be encouraged by the Division of Fish and Wildlife or whether this should be left to private groups is a matter for debate. My personsl impression is that studies toward finding and removing the cause of "low" periods in the native game-bird population offer wider possibilities in the provision of sport and recreation as well as of food.

Wild Ducks and Wild Geese

Wild ducks are native to most of the lakes in Northern Ontario and wild geese use the northern Barren Lands as a nesting ground. Duck hunting is one of the most widely practised sports and, during the open season, extends over

practically all the lakes and marshes in the southern portions of the Province. Although statements are sometimes noted in the press expressing alarm about the future of wild ducks, no evidence was offered to the Commission indicating any concern on this score.

Wild geese are more difficult and more expensive to reach. Unless one can afford to go north and shoot them before they migrate, the opportunities of shooting them are not extensive.

Fish

In areas where hydro developments or any dams for stream-control have raised water to such an extent that spawning conditions have been seriously altered, the fish population seems to have suffered rather severely. Silting and water discoloration have resulted in Lake Nipigon due to the Ogoki Diversion and in the Seine River area due to the Steep Rock development, and I am alarmed about the effect this will have on the fish. It is possible, however, that economic considerations will overshadow the harm done to the fish.

Ontario is studded with beautiful lakes, practically all of which might be developed into outstanding recreational assets. A broad programme of road development to open up all major watersheds and which would make these lakes accessible and thereby relieve the drain on lakes closer to population centres, coupled with a programme of improved fishing conditions, promises sound economic possibilities. It is a well established fact that, within reasonable limits, science can assure a crop in pounds of fish per acre of lake in much the same manner that it can assure a crop in bushels per acre of farm, or cubic feet of wood per acre of forest. It is possible that we have pursued just as thoughtless a course of exploitation of our fish resources as we have of our forest resources; but the restoration of our fish resources will require a much shorter time, except in those streams and lakes which require reforestation to return them to their original, natural condition. It should be initiated on a soundly planned basis, starting in the localities closest to roads and railways.

I recommend:

(1) "Dated" licenses, possibly of different colours, identified with areas which have different periods of open season for the same species.

(2) The rigid enforcement of a regulation that one license permits the shooting of only one deer or moose.

(3) The enforcement of a regulation that guides or others may shoot only one deer and that each license will carry one detachable affidavit form which must be signed by the holder, testifying that he personally shot the animal to which it must be attached.

(4) That provisions be made on licenses for a "written" statement of game taken, including the locality and other pertinent information.

(5) Research as to the causes of the gradual disappearance of moose; the effect of stream pollution on fish; water levels and flow; the feeding habits of deer and moose; the variations in bird populations and the reasons therefor; the effect of birds in controlling

forest insects, etc. There are dozens of similar problems requiring solution.

(6) The establishment of temporary game sanctuaries. When game becomes scarce in any locality, it might well be declared a sanctuary for a period of five or ten years, then opened to hunting again.

(7) The setting aside of a couple of townships devoted exclusively to the more primitive method of hunting with bows and arrows, etc. It would appear that this form of sport calls for the maximum of hunting skill, without causing as serious a depletion of game as firearms. It is definitely possible to kill deer with arrows, and it would seem of little consequence to the deer whether the missile was discharged from a bow or a rifle.

(8) The development of better fishing conditions for game fish in our more widely advertised areas. While working in the neighbourhood of Lake Nipigon last summer, I met no tourists who had taken a satisfactory catch of fish; but I did meet several who were irate because they had come a long way to fish in the widely advertised Nipigon waters, and returned empty handed except for a few pike. It is possible that other regions may impress outside fishermen in a similar manner. A few such disgruntled tourists describing their experiences may seriously endanger a growing industry.

(9) That the Division of Fish and Wildlife attempt to establish the needs, if any, for a proper biological balance of porcupines and that, in the meantime, huntsmen and others declare a relentless war on these forest destroyers. Although porcupines are not game animals, they are often encountered by huntsmen and opportunities for their destruction are many. One widely experienced forest engineer has told me of killing twenty-two porcupines during a season in one camp. This represents merely the surplus population on probably a very few acres of one of their favourite habitats.

I again emphasize the fact that little is known of fish or game populations or the migrations, feeding habits or diseases of game. Scientists who know most about the subject were the least sure of their information or the solutions to the various problems, while those who had little or no authentic data were ready with all the answers for their own localities.

In the past, the policing aspects of the work of the Game and Fisheries Department have been accentuated, but it is gratifying to note that since the transfer of these activities to the Department of Lands and Forests, a scientific approach has been inaugurated toward the study of fundamental problems. This policy should be carried on with increasing vigor.

A relentless war should be continued on poachers and the buyers of their illicit catch of furs, with heavy fines and the cancellation for life, or for at least five years, of the licenses of these latter human pests. To this should be added a refusal to issue, during the period of cancellation, a license to any member of the immediate family of a buyer so convicted without a full investigation of the applicant. From information received from many sources concerning illegal dealings in furs, it is evident that the trail of corruption pursued by this class of criminal has been altogether too long and that the penalty for following it should be increased drastically.

CHAPTER XIII

Research

Probably the most notable impediment to the proper consideration of almost any phase of forestry in Ontario is the lack of fundamental data concerning it. No matter what avenue one now attempts to explore, it sooner or later develops that positive conclusions are impossible because of the lack of scientific and precise data.

Enumerated below is a partial list of the subjects on which precise data is required but is not available on any scale comparable with needs:

(A) Definite knowledge lacking and urgently needed on—

(1) Rates of growth in stands of varying ages and compositions on different sites.
(2) Reproduction following various cutting-methods on different sites and in different types.
(3) Effect on future forests of various methods of slash-disposal under different forest-types and cutting-methods.
(4) Effect of fires on cut-over areas.
(5) Effect of different cutting-methods on biological life in the forests.
(6) Losses from insects and diseases, and their long-term effect on forests.
(7) Comparative costs of different systems of silvicultural treatment.
(8) Sinkage losses on drives and how to minimize them.
(9) Causes of decay and disease in standing timber.
(10) Species best suited to planting on heavy soils and swamp areas and the methods to be followed.
(11) Species and methods to be used for planting on limestone plains.
(12) Development of lighter and more efficient forest-fire pumps.
(13) Forecasts of fire hazard.
(14) Fish and game populations and their migrations under various conditions.

(B) Pressing needs in utilization research concerning—

(1) The possibilities and economics of developing products of higher category than is now the practice.
(2) The possibility of development of more efficient basic manufacturing methods. Present methods, particularly in sawmilling, are to a large extent due to tradition.
(3) Utilization of waste products of forest industries.
(4) Development of new products and new uses for present products.
(5) Processes enabling the utilization of a higher percentage of the raw materials as primary products, both in the woods and in the mills.

(6) Methods for the more efficient handling, packing and transporting of low-value products of sawmills.

The handicap under which the Research Division has functioned is well recognized and the development of its activities, as personnel has become available, is a source of gratification. I wish, however, to emphasize the vast need for expansion in all lines of research activity and for the compilation of information in a readily usable form. Until unbiased and authentic data are available, our forest activities can only be carried on using rule-of-thumb methods and theories which are often far from sound. Research must assume an increasingly important role in all forest enterprises if they are to develop along sensible lines.

DOMINION GOVERNMENT RESEARCH FACILITIES AVAILABLE

The Dominion Forest Service has branches dealing with forest economics, silvicultural research which includes growth and regeneration studies, forest protection, forest survey and aerial mapping methods. It maintains two well equipped forest products laboratories and five experimental stations in various parts of the Dominion, and co-operates in the activities of the Pulp and Paper Research Institute. It could and should serve as the agency for assembling and co-ordinating the work of the various provinces with its own. Every effort should be made to standardize methods of collecting and recording data so that results may be comparable with those in other provinces and will fit into the national picture. The benefits from such co-operation are many and without it the value of data obtained is considerably reduced.

FOREST EXPERIMENTAL AREAS

I recommend that the Province give serious consideration to the development of at least four experimental areas which should be established in locations typifying the growth and operating conditions over wide regions. The Petawawa watershed, or a considerable portion of it, would be suitable for one of these stations. I would suggest another in the Clay Belt, one in the Algoma district and one in the Lakehead region. These experimental areas should each extend over one or more minor watersheds and should be large enough to allow full-scale camp operations on a sustained-yield basis. All species should be cut and diverted to their proper economic uses. Different cutting and regeneration methods should be tried and comparative costs and results obtained and tabulated. A medium-size sawmill should be an integral part of each experimental unit. This would be necessary in order to permit of a properly developed, multiple-use operation and, in addition, the sawmills would be an indispensible need in conducting research work in connection with the lumber industry. Some research projects of this kind have been mentioned above.

I visualize these operations as training grounds for scalers, forest rangers, sawyers, clerks and all the junior grades of forest administrative staff. They would furnish pools of highly trained fire-protection personnel, strategically placed within three hours flying time of almost any fire in the area at present protected. A couple of trips with the Canso plane would furnish any large fire with a group of trained fire-fighters, each one of whom would be worth at least four of the type normally picked up from the local unemployed personnel in the district.

Any products resulting from the operations in these experimental areas could be sold in the open market and, if a loss is incurred, it might be charged to education and research. They might easily prove to be self-sustaining or better. In any event, they would provide proving grounds for methods and theories which could take much of the guesswork out of logging and silvicultural practices, and I can well imagine that many of the personnel trained on them might be enticed into industry. This would be a satisfactory means of extending sound practices learned on the forest experimental areas to the firms employing personnel so trained. I also foresee a mutually useful association between these research units and the Foresty School of the University of Toronto. The former would provide opportunities for both study and employment, the latter would act as a source of counsel and of trained and semi-trained technical assistants.

The areas could be utilized as the location of sample plots for many types of study, both in virgin forest and in cut-over areas and, I believe, could serve the forest industries even more fully than experimental farms serve agriculture.

CHAPTER XIV

Education and Publicity

In Chapter VII, I have recommended a new Division to be known as that of Education and Publicity. Wide personal contacts with all classes in the Province, and representations made at the public hearings of the Royal Commission, have convinced me of the need of broadened effort along these lines. The vast majority of the public know little about their ownership of the forests, their responsibilities and their potential control over forest operations and maintenance. They do not know of the legislation already in effect or of its impact on the forests. Many citizens at our public hearings advocated action which had already been taken toward the solution of the very problems they discussed.

If we are to overcome the inertia which has prevented sound forest policy for many decades, we must for a time concentrate public thinking on existing conditions and the methods by which they may be improved. The consequences of making these improvements and the alternative of leaving things as they are, should be clearly focused in the public mind.

To carry out a programme of the scope required to meet the needs of forestry, use must be made of every vehicle available to spread informative and factual information pertaining to the serious aspects of the provincial foresty situation. This will include talks and lectures at educational institutions, at service clubs, to members of trade associations and to the public generally. It will require the constant publication of suitable articles in the daily and weekly press and periodicals. Moving pictures, widely distributed to schools, and forums with radio addresses by prominent and nationally known citizens, should all play an important part in forestry propaganda for the next decade or more.

Training requirements call for several schools for instructing scalers, rangers, timber cruisers and clerical personnel for government service; and sawyers, foremen, cruisers, fire fighters, clerical personnel and cooks for industry. These could well be integrated with the forest experimental areas advocated in Chapter XIII. The full time of the school under construction at Dorset may be taken up in training engineering students from the School of Applied Science, undergraduates from the Faculty of Forestry and the staff of the Division of Fish and Wildlife, and with refresher courses for forest-protection and scaling personnel. I foresee needs much beyond the capacity of this school for several years ahead, as it must be realized that requirements far exceed the supply of trained employees in all the above-mentioned groups.

The need of a standard method of selection of candidates to be trained as scalers, rangers, clerks, etc., is stressed in Chapter X on Forest Protection and I again draw attention to it here.

The educational effort in forestry subjects in primary and secondary schools should be much more heavily stressed. It seems too much to hope that many extra classes in forestry matters can be added to the present curricula of lower schools. It should be possible, however, to instruct future teachers in the

fundamentals of the subject during their term at Normal Schools and to give similar training by means of Summer Schools to those who hold certificates as teachers.

Instead of adding to public or secondary school curricula it should be possible, through a revision of text books, to include much sound forestry in the ordinary classes. Problems in arithmetic might be related to the growing or harvesting of forests. History and geography might well contain much that would be interesting and instructive to pupils concerning the devastation of forests and the effect on the nations concerned. For instance, in parts of Syria, which were once well forested and maintained a populous and wealthy civilization with large cities, the people devastated their forests and these parts are now virtually an uninhabited desert, with the old stone roads, built twenty or more centuries ago, standing several feet above the general level of the eroded countryside. The shores of North Africa were once well wooded and gave birth to huge cities like Carthage. With their forests gone, instead of remaining the granary of the Mediterranean, they became the deserts that Wavell and Rommel fought over a few years ago.

Bruce and Grey Counties were amongst the most prosperous in Ontario 50 or 60 years ago. To-day their population has shrunk by 40 per cent, with roughly one farm in every ten abandoned. Unless remedial measures are taken on a large scale, they are most likely doomed to further losses. Other areas in the Province are degenerating in the same way.

On the other hand, there are forests in Europe which have been cropped for hundreds of years with no sign of deterioration. In Sweden, the whole economy of the country is based on forestry and, in competition with the world, they have maintained their forests and a standard of living and happiness comparable with any to be found elsewhere.

These and many similar examples could be woven into the fabric of our school training and, coupled with school forest-plantations, within a quarter of a century there will have been produced a class of citizens jealous of our forest heritage and its place in our national life.

I consider the needs too urgent to be relegated to a branch within a Division of the Department and I would fear lack of sufficient stress to overcome past neglect if the handling of publicity were left to the less vitally interested direction of a general publicity bureau of the Government. It constitutes a full-time occupation for experts and enthusiasts, if the necessary aims are to be achieved. **I therefore recommend that the work be carried out by a new Division of the Department.**

CHAPTER XV

Export of Pulpwood

During the public hearings of the Commission, the question of the export of unprocessed pulpwood from Crown lands came under criticism more often than any other aspect of forest exploitation in this Province. The attack was exceedingly bitter from some directions, but some of the exporters made a vigorous defence. Probably the most telling blow administered was by a former exporter who characterized as "economic suicide" the recent widespread practice of cutting wood by prisoners-of-war, and shipping it out of Canada for manufacture.

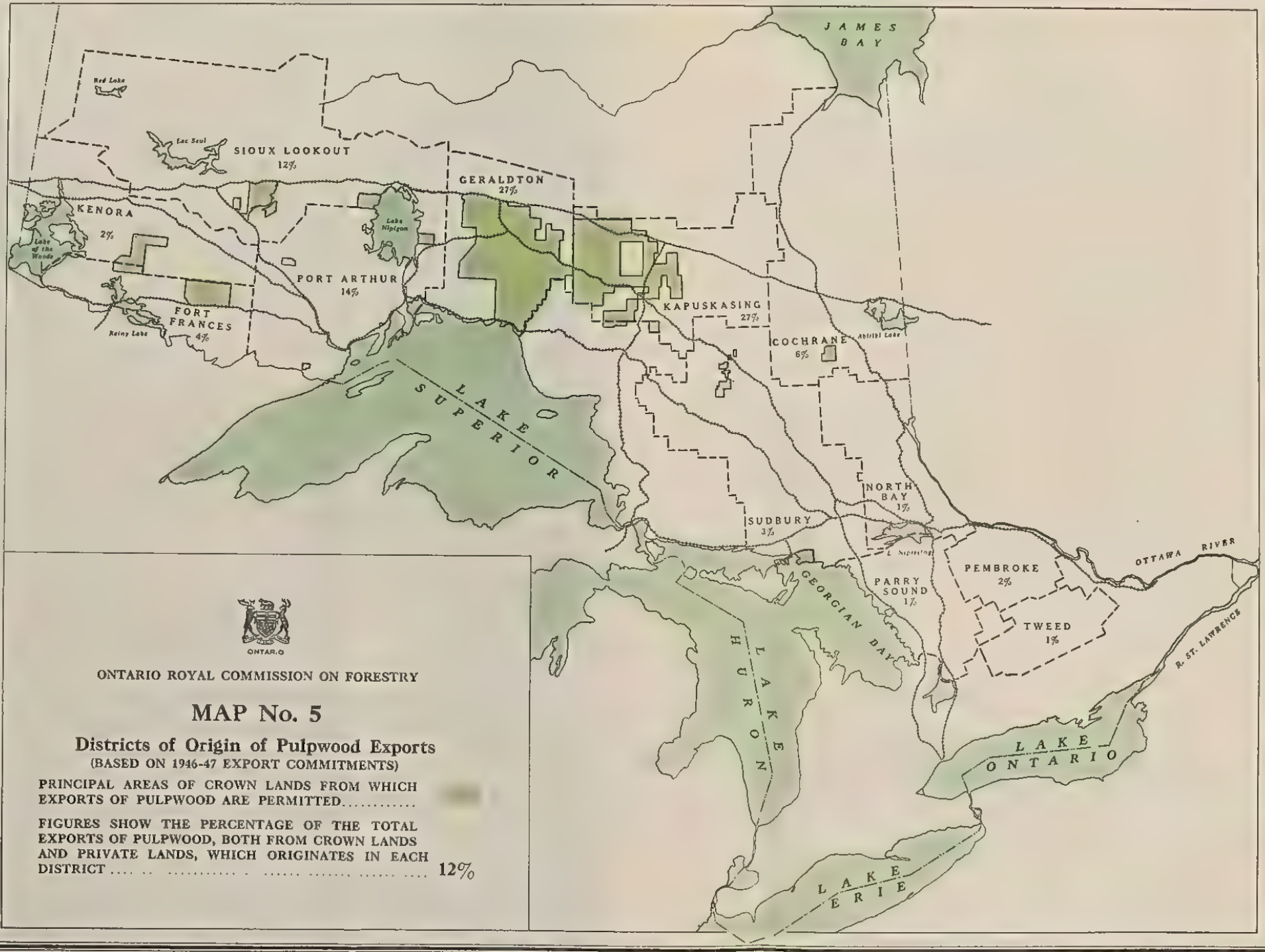
Map No. 5 shows the percentages of the total quantity of export pulpwood originated in the various Forest Districts of the Province.

As outlined in Chapter I the matter of export of unprocessed wood has been a contentious subject for a long period. During the 19th century arguments first arose over the export of tanbark and later concerning sawlogs. The export of pulpwood from Crown lands is of much more recent origin.

Some companies purchased freehold lands many years ago and for twenty years or more have been exporting pulpwood purchased from settlers, in addition to that cut on their own freehold land. As it turned out, the purchase of pulpwood from settlers for exportation had much the same effect as if it had been taken from Crown lands. Most of the wood so obtained came from pseudo-settlers who, after being located for free grants on well wooded lots, abandoned them after clearing off the pulpwood and selling it to domestic mills or to exporters. The pseudo-settlers then took up new lots and repeated the process as often as it became necessary to do so. Hundreds of thousands of acres of lands capable of growing splendid forests, but marginal or sub-marginal as farmlands, have been devastated in this manner. The Lakehead area and the Clay Belt along the Canadian National Railway west of Cochrane bore the brunt of this onslaught, and thousands of lots have been abandoned in these areas.

The acreage of forest land thus denuded in the past quarter century is shown in the diagram below.

Diagram indicating the comparatively small part of the acreage devoted to colonization which was genuinely settled as contrasted with the much larger area stripped of timber and returned to the Crown.



ONTARIO ROYAL COMMISSION ON FORESTRY

MAP No. 5

Districts of Origin of Pulpwood Exports

(BASED ON 1946-47 EXPORT COMMITMENTS)

PRINCIPAL AREAS OF CROWN LANDS FROM WHICH EXPORTS OF PULPWOOD ARE PERMITTED.....

FIGURES SHOW THE PERCENTAGE OF THE TOTAL EXPORTS OF PULPWOOD, BOTH FROM CROWN LANDS AND PRIVATE LANDS, WHICH ORIGINATES IN EACH DISTRICT 12%

Few real settlers remain on the land so alienated and of those who have remained in the Clay Belt, many continue to be aided by supplementary annual permits to cut 50-250 cords per family on other lots in their vicinity.

About 15 years ago it became apparent that the quantity of pulpwood produced, on lands set aside for colonization within economic hauling distance of the railways (seven or eight miles on either side), could not be further increased and, in fact, would soon have to be drastically reduced by reason of denudation. New sources were necessary if the dealers involved in the trade were to supply their customers, both domestic and foreign.

At that time Ontario, with the rest of Canada, was suffering from unemployment and it is not difficult to appreciate the temptation which the promise of gainful employment for woods labour presented to the administration of the day. They succumbed to the temptation and there can be little, if any, blame attached to them, even though it meant the reversal of a policy which had become almost a religion with previous administrations in this Province, and is still the inflexible policy of the Province of Quebec, namely, the retention for domestic (Canadian) use of all wood cut on Crown lands.

The story is well told in the evidence of the Minister of Lands and Forests before the Select Committee of the Legislature in 1940. He testified that the change in policy was required:

(a) as an employment scheme, and

(b) as a salvage measure to remove overmature timber.

Whatever may have been the situation when the policy of export was first inaugurated, neither reason is now soundly based. The giving of employment in the woods to a few hundred men in order to export pulpwood merely makes it possible for mills to continue in operation in another country instead of being established in Canada and giving employment here. However, as a short-term expedient in a period of unemployment, the practice cannot be condemned. The latter reason, however, does not apply to-day at all. The field work of the Commission did not reveal any exporter working in overmature timber. Many spruce stands which were being cut were in age-classes between 100-135 years, but there is little sign of deterioration in such stands until after 175 years.

The Minister cited the quantities produced in and exported from the Thunder Bay region in 1937, as follows:

	Cords	Cords
Permissible cut of spruce and balsam	742,000	.....
Spruce and balsam used by domestic mills	.....	425,715
Spruce and balsam exported from Crown lands	.....	218,067
Net excess over exports and consumption	.....	98,218
	742,000	742,000

He expressed satisfaction with the situation and argued that a further 100,000 cords could have been exported without detriment to the local situation.

Most of the earlier export agreements contained provisions requiring the building of mills in Ontario, but in no single instance did any of the signers fulfill their obligations in this respect with the result that the agreements were subsequently cancelled. In some cases, re-negotiations of agreements have more specific obligations concerning the building of mills.

The export of unprocessed wood has however progressively expanded till, in 1946, the total permisslble cut for export amounted to roughly 890,000 cords from Crown lands, with an additional 50,000 cords from the Algoma Eastern Railway lands exportation from which is subject to government control and export levy.

The transfer of cutting for export from so-called private lands to Crown lands is graphically portrayed in the following table based on information supplied by the Department of Lands and Forests.

PULPWOOD EXPORTED FROM ONTARIO

Year	Cords cut from		Total	Adjusted Totals*
	Crown Lands	Other Lands		
1928	840	611,984	612,824	.....
1929	4,872	423,579	428,451	.....
1930	191	496,343	496,534	.....
1931	860	402,587	403,447	.....
1932	35,407	109,362	144,769	.....
1933	26,240	190,566	216,806	.....
1934	84,042	196,115	280,157	.....
1935	45,413	220,741	266,154	.....
1936	118,633	221,698	340,331	.....
1937	218,067	283,496	501,563	.....
1938	324,844	288,212	613,056	.....
1939	258,654	174,506	433,160	.....
1940	362,481	188,346	550,827	.....
1941	404,328	230,970	635,298	689,300
1942	482,597	254,450	737,047	790,000
1943	408,504	174,491	582,995	621,000
1944	250,220	134,358	384,578	401,000
1945	395,441	153,914	549,355	568,000
	3,421,634	4,755,718	8,177,352	.....

*Totals after 12½ per cent. adjustment for conversion of cords of peeled wood to cords of unbarked wood.

During the season 1945-46, 2,424,419 cords of spruce, balsam and jack pine pulpwood were cut on Crown lands under lease and of this amount the Department of Lands and Forests approved the export of 843,931 cords. In addition to the above amounts, 29,434 cords of poplar pulpwood were cut on leased Crown lands and 81,200 cords of all kinds of pulpwood were cut under permit on Crown lands not under lease. A portion of these two latter amounts was cut for export, but the Department will not know how much until applications for permission to export are received. Of this quantity, some would be shipped to domestic mills and compensating adjustments made. How much actually left the Province cannot readily be ascertained. There are three sets of figures: those of the Department of Lands and Forests, those of Canadian Timber Control and those of the Dominion Bureau of Statistics.

Comparison of these figures necessitates adjustments for different conversion factors between cords of peeled wood and cords of unbarked wood. The Department ignores this difference. Timber Control adds 1/7 or 14.3 per cent to the figures of peeled wood and the Dominion Bureau of Statistics adds 1/8 or 12½ per cent to peeled cords. In order to get a reasonable comparison between the

three sets of returns, all quantities of peeled wood reported have been adjusted on the 12½ per cent ratio.

On the above basis the following comparative figures emerge:

REPORTS OF EXPORT OF PULPWOOD FROM ONTARIO

	1943	1944	1945	1946
	Cords	Cords	Cords	Cords
Ontario Department of Lands and Forests	621,000	401,000	568,000	794,000
Canadian Timber Control	660,000	477,000	590,000	830,000
Dominion Bureau of Statistics	668,000	547,000	655,000	(Figures not yet available)

In compiling its export figures, the Department relies on clearances given to exporters by District Foresters, and has an arrangement with the Customs Division of the Federal Department of Revenue to hold up at border points shipments not covered by clearance papers. It seems possible that this latter arrangement could be defeated. The final Timber Control figures are compiled from returns made by the importers who receive the wood, checked against tentative figures supplied by the exporters when applications for permits to ship are forwarded to the Federal Department of Trade and Commerce. Dominion Bureau of Statistics figures are based on clearances through the Customs Ports at Ontario border points. Because a good deal of wood from other Provinces leaves the country at points in Ontario and because a certain amount of Ontario wood is exported through Customs Ports in Quebec, some adjustment has had to be made in the Bureau of Statistics official totals to arrive at a fair estimate of the quantity of Ontario wood leaving the country. It is impossible to arrive at a precise answer because no record is kept of the points of origin of the pulpwood exported, but by inquiry this Commission has arrived at what it believes to be a reasonable adjustment. It is physically impossible for customs officers to measure individual shipments but the shipments are checked against the exporters' estimates of the quantities loaded. It will be noted that, with 1944 an exception, there is essential agreement between Timber Control and Dominion Bureau of Statistics figures. Preliminary Dominion Bureau of Statistics figures for 1946 indicate that similar agreement will apply.

INCREASED INVENTORIES OF WOOD CUT FOR EXPORT

Figures relating to shipments of pulpwood apply to calendar years. At the 1st of January each year, Ontario exporters report to the Canadian Timber Control the quantity of exportable pulpwood cut but not exported at that date. This carry-over was reported as 392,000 cords as of January 1, 1944. The corresponding figure for 1946 was 995,000 cords, with preliminary but not complete figures for January 1, 1947, showing a similar amount. This indicates an increase in inventory in Ontario of slightly over 600,000 cords or, in other words, the cutting by exporters since 1943 of that much more wood than they have exported. No doubt some portion of this wood has gone to domestic mills, but it would amount to less than one-third of the above quantity.

The figures quoted, I believe, emphasize the necessity for a close and more comprehensive control by the Government over shipments of wood. There are many weakesses in the system which permit of overshipments, or result in the

confusion of accounts between wood cut on Crown lands and private lands. There are certainly signs of confusion shown by the figures in the above tabulations.

The interlocking characteristics of some of the exporting companies and individuals make it difficult to trace the destination of some of the wood without an intimate study of the records of the various operators concerned. (One dominant individual is identified with five exporting organizations.) I decided that detailed investigation into this subject was not justified as it would, of necessity, cause considerable delay in the presentation of my report and the general trend in relation to pulpwood exports is sufficiently clear without allotting the exact share of the trade to each participant.

EXPORT AGREEMENTS

Since 1937 many export agreements have been negotiated, with keen bargaining apparent in practically all of them. In my opinion, the welfare of the Province has not always been adequately safeguarded. In many of the earlier agreements which provided for the establishment of Ontario mills, the size of the mill specified and its description indicates that it was merely a pawn in the game of obtaining limits carrying export privileges. In instances involving large areas of timberland, a 100-ton pulp mill would be specified, but no mention would be made as to whether it was for the manufacture of groundwood pulp or of chemical pulp, though the latter type of pulp requires almost double the quantity of wood.

The trend of pulpwood agreements generally has been toward increased export shipments of unprocessed wood, without comparable increases in domestic production of pulp or paper. In one instance the largest shareholder of a company having an export agreement purchased the shares of the other corporations involved which in turn were given new export privileges; the result is that the total quantity of pulpwood which may now be exported, from the total area now involved as a result of the deal, is almost double the original quantity.

At the present rate of cutting, few of the exporters have sufficient limits to provide for operations on anything approaching a sustained yield basis. The maximum annual cuts provided for in most of the agreements grossly exceed the possible annual growth on the areas involved under the cutting methods used or likely to become feasible in the near future.

Annual cuts permitted by export agreements vary from slightly under one quarter of a cord per acre per year to over a cord per acre per year. The average for the group is well above that permitted on Sweden's managed forest lands, which is just under one-third of a cord per acre per year, where sound silvicultural practices are the rule. Practically all agreements, however, have a saving clause which obligates the operator to practice "good forestry". Except under unusual circumstances, "good forestry" precludes cutting in excess of the annual replacement. While the "good forestry" clause has not been observed to date, it should be invoked at least to the extent of keeping the annual cut commensurate with the annual replacement under the silvicultural system practiced.

One export agreement permits the shipment to the United States of one cord of wood for each cord used in the domestic mill built under the agreement. It also contains a clause which obligates the company, at the direction of the Minister, to cut into sawlogs, poles, etc., material suitable for that purpose. I

am convinced that only by avoiding expansion in domestic production, and therefore in exports, can the timberlands concerned continue to furnish wood in perpetuity for all three purposes. Several clauses in this agreement are indicative of very keen bargaining to guarantee a specified quantity of wood for export before any effort is directed toward the provision of wood for domestic mills.

I wish to draw attention to a clause in one export agreement which provides for the export of a maximum of 25,000 cords of spruce and balsam annually until 1962, "notwithstanding the provisions of any Act or Regulations from time to time in force respecting the exportation of pulpwood." This clause attempts to place a private contract in a superior position to the laws of the Province and, while it is probably worthless, it might be very misleading to security holders and possibly to junior officials in the district.

I recommend a review of all export and domestic agreements, with a view to the adjustment of permissible annual cuts to correspond with the probable annual growth on the areas involved. Until such time as annual growth has been definitely established, beyond shadow of doubt, by proper growth studies approved by the Department, it should be calculated at a rate not exceeding 10 cubic feet of conifer timber per acre per year over the superficial area of the limits involved.

It should be realized that export agreements now extend over more than ten thousand square miles of some of the best remaining timber stands for the production of sawlogs, ties and poles. Other export areas also contain materials suitable for these uses, but not to such a marked degree.

NEWSPRINT CLAUSE IN EXPORT AGREEMENTS

Much weight has been attached to the clause inserted in all export agreements prohibiting exported pulpwood from being utilized in the manufacture of newsprint. In my opinion, this clause is of little effect in that pulpwood exported from Ontario goes into the United States pulpwood pool and relieves that pool of some of the competition between newsprint manufacturers and others. It matters little which cord goes to the newsprint mills, one from Ontario or one from the United States or any other source made available by the shipment of a cord from Ontario. As mentioned earlier in this report, paper made in United States mills competes on the home market with that made in Canada.

EFFECT OF EXPORT OPERATIONS ON THE WOODS WAGE STRUCTURE

Another feature, which may not have occurred to the general public, is the woods-labour situation created by the expanded export trade in pulpwood in the past five years. Some exporters permitted their woods operators to outbid domestic companies for labour during the later war years and the post-war years. This had a very unsettling effect and frustrated the best efforts of the domestic mills who were endeavouring to maintain controlled wage ceilings. Overbidding for labour is admitted, and even glorified, in a brief presented before the Commission by one of the larger exporters. I quote from this brief: "I managed, through the Legion, to interest 35 men all quite young, from 20 years of age and up. They were all without previous experience. Some of them were quite frail. *As an independent* (italics by the Commissioner) I was able to take these men and to guarantee them not only a decent living wage, but a very generous

wage if they would only try the job. We started them off with a flat guarantee for the first month, a salary much higher than any of them had received previously. They all tackled the job in great style and learned very quickly. We made the top wages retroactive from the commencement of the work, then placed them on a piecework basis, which netted them between $12.00 to $14.00 per day clear, and at the end of the year they received a bonus of $16,000 for the group."

The effect of such action must be most upsetting to skilled mechanics and professional men who spend years in gaining skill, only to find themselves earning much less than relatively untrained pulpwood loaders. Such action has been gravely damaging to the morale of woods labour and has created an almost intolerable situation for the operator who must control his cost structure in order to remain in business.

In my opinion, one of the main reasons why exporters have been able to permit such tactics is the financial condition of their companies as compared to that of Ontario companies. Funded debt and other financial obligations of the former have been liquidated over many years of operation and their financial burden per ton of production is therefore much lighter than that of the newer Canadian mills. This is clearly indicated in the table below.

CAPITAL AND CURRENT LIABILITIES OF THE PULP AND PAPER INDUSTRY OF CANADA AND THE NORTHERN UNITED STATES IN 1945*

(By percentage for regional groups of representative firms)

Regional Group	Number of firms in Group	Bonds, loans, deferred bond interest, etc.	Preferred Stock	Common Stock and Surpluses	Current Liabilities
Northeastern States[1]	14	12.0%	10.0%	68.3%	9.7%
Lake States (firms with no Canadian plants)	20	14.3%	11.0%	62.6 %	12.1%
Lake States (firms operating plants in Canada)	4	20.0%	9.6%	60.4%	10.0%
Ontario[2]	10	37.4%	29.3%	25.7%	7.6%
Quebec, New Brunswick and Nova Scotia[3]	7	50.9%	4.2%	36.3%	8.6%

*Compiled from "Moody's Manual of Investment, 1946."

[1]Including several firms with extensive freehold or leased timberlands in Eastern Canada.
[2]Including some firms also operating in other provinces and two firms whose most recent published financial statements were for 1944.
[3]Including one paper company and six of the largest pulp and paper companies, the latest financial statements for two of which were for 1944.

It is natural for domestic pulp and paper mills to feel that some of the differential indicated has been utilized in outbidding them in the woods-labour market.

EFFECT ON LUMBER INDUSTRY

Labour rates on pulpwood operations are inevitably reflected in the cost of sawmill operations. The effect of rising woods-labour rates, combined with controlled domestic prices, is disturbing. Sawmill operators were compelled to sell half to two-thirds of their lumber at closely controlled prices on the local market. In order to remain in business, the lumber industry claims it has had to obtain export prices sufficiently high to compensate for the lower prices on domestic

sales. What may be the long-term result of this policy of making export sales pay for domestic losses is a problem which will have to be faced when the present boom market for lumber has passed and Great Britain, Canada's traditional market for lumber, will have Russian and Scandinavian supplies available in abundance. Goodwill sacrificed is difficult to regain.

I am not advocating low woods-labour rates and will treat with that subject in a later chapter. There must, however, be some stability and some control of such rates, otherwise both industry and labour will eventually suffer.

EXPORT FROM CROWN LANDS NOT UNDER EXPORT AGREEMENTS

In addition to pulpwood exported under agreements which have been made public, there have been smaller but substantial amounts cut on concessions or on lands under license which, according to the original contracts with the Crown, carried no export rights whatever but on which permission to export has since been granted on a year to year basis.

In the case of one company, in spite of the fact that their contract specifically states otherwise, export of substantial amounts of jack pine is permitted, although this same company has closed its two sawmills which formerly contributed large quantities of lumber, ties, etc., to the provincial output.

There are sixteen other limit-holders who have export permits and they have cut over 80,000 cords during the past season. It is not feasible to ascertain exactly how much of this material has been exported.

BENEFITS CREATED BY EXPORT OF PULPWOOD

The preceding paragraphs have recited many, if not most of the drawbacks inherent in present export agreements and practices. It would be entirely unfair to close this chapter without presenting the other side of the picture.

It should be appreciated that the export of unprocessed pulpwood has yielded millions of dollars to Ontario in Crown dues and revenue of that nature. It has paid further millions in wages to woods workers (some of whom were prisoners-of-war), much of which was paid in years when it was desperately needed. Transportation systems and suppliers of equipment, food and fodder for woods operations have reaped substantial benefits from the trade. It has had a stimulating influence on the price of pulpwood which farmers and settlers produce from their lands. This is not the least of its benefits, and provides one of the soundest arguments for the continuance of exports. The Canadian representatives of the United States companies involved are, in general, a splendid type of citizen and many of them have given generously of time and money to philanthropic causes. Most of the companies have co-operated liberally with Canadian industry in the development of logging technique and equipment.

GENERAL COMMENT ON EXPORT OF PULPWOOD

If the unsound forestry practices inherent in existing agreements were eliminated; if the use of unfair and destructive tactics in the hiring and paying of woods workers were stopped; if, instead of "mining" spruce, the companies concerned concentrated on the removal of all pulpwood species in relation to their occurrence on their limits and finally, if the present illogical grouping of

A good pulpwood stand on the limit of an exporting company.

limits operated were rationalized, I am convinced that there would be an even greater quantity of wood available, over and above the present domestic requirements, than is the case at present. The possibilities and methods will be treated with in the final chapter of the report.

Whether the export of unprocessed wood is sound as a long-range policy for Ontario is open to grave doubts. I cannot believe that any system of long-term agreements, which permit over-cutting of timber and "mining" of the most desirable species, is a sound policy. As long as the present export policy continues in effect, the people of this Province may well be classed as "hewers

of wood" for the United States mills who are the beneficiaries. It is to be noted that no Canadian company which has an export agreement has a Canadian paper mill dependent upon the area leased. It is only by manufacturing a more highly developed product than pulp that we shall reap the optimum advantage of our forest resources.

For the present, export can be defended and any remedial action taken should be gradual rather than precipitate. The national feature of the problem should be properly weighted but not overweighted, as is the tendency in some circles. Companies which have maintained operations in the Province for many years have a greater claim to consideration than those which have entered the field recently.

I was much impressed by the argument in one brief presented before the Commission. It pointed out that unprocessed pulpwood exported has a value of roughly half a cent per pound, but if this same wood were processed it would result in a product worth at least four cents per pound and possibly several times that amount. The difference in cost per pound between the pulpwood stage and that of the finished product would be made up largely of wages paid to Canadian labour. **I subscribe to the idea expressed, and recommend that the future policy of the Province be aimed toward the development of the final product at the higher cost per pound.** In the meantime, there should be made available for export only the annual growth which is surplus to the needs of present domestic enterprises and their normal expansion, including the building of new mills.

CHAPTER XVI

Labour

The woods workers in different parts of the Province work under a wide variety of conditions with respect to wages, housing, feeding, transportation, etc.

Present day conditions are very different from those existing on lumbering operations in their hey-day, when workmen signed on for the "run" or until operations were completed, and lived under somewhat primitive conditions of housing and feeding. In those days the "lumberjack" usually returned year after year to the same company and served it with a fierce loyalty, even to the extent of engaging in physical encounters with competitors. There was an intense pride in workmanship, and men vied with one another in cutting or hauling more logs than their comrades and in being the last man ashore when the jam in the river was released. Companies were smaller, and a more personal relationship existed between employer and employee than is at present possible.

Monthly wage-rates, extremely low in comparison with to-day's earnings, were then the rule, with piecework almost unknown. Workmen's Compensation, and Health Department inspections were almost unheard of, but it should be mentioned that the more responsible lumber operators in those days were generally kind and generous to employees suffering accident or illness.

To-day the story is of almost a complete reversal of these conditions. Woodsmen do not return year after year to the same employer. There is little evidence of loyalty to, or affection for, the corporations employing them. They rarely, if ever, see or know the "big boss" who is responsible for their well-being or their shabby treatment, whichever may apply. There seems to be little pride in accomplishment of good work well done, and the production rate per man-day is falling. About the only similarity to the old conditions which remains is the lack of thought for the future of the resources from which they make their living. Unfortunately this is not to be wondered at, as it is apparently the attitude of the general public.

Living-conditions in camps are healthy and comfortable, though not very attractive. Food is generally of top quality, and many woods workers suffer gastric disturbances because of its richness. Workmen's Compensation provides for lost time and impairment of earning capacity, of either a temporary or permanent nature, resulting from accident. The Department of Health in-inspects and reports on camps, though many of the camps of small jobbers and "shackers" seem to have been missed. **I recommend a much more thorough examination of these smaller camps, as I believe the conditions which were apparent in many small camps during my inspection tour in 1946 would not be tolerated under even a lax system of inspection.** Practically all the larger camps across the Province were satisfactory from the hygienic standpoint, though in some instances I was struck by the fact that drier sites could have been selected.

Larger camps are normally electrically lighted and arrangements are provided for washing clothing, by contract, at low rates. Drying-rooms for wet

clothing are usually provided although medium-size and smaller camps, in many cases, still permit drying of clothes in living quarters.

Cooks are not generally well trained, and are wasteful. No standard of training has been set up, except on a very minor scale through courses for cook instructors under the auspices of the Woodlands Section of the Canadian Pulp and Paper Association. Wide possibilities for saving exist in the preparation of food. A drive conducted during wartime by the Army to eliminate waste by improvements in the training of cooks, the provision of weekly diet sheets and the daily inspection of garbage cans, resulted in reductions in Army food costs per man-day (exclusive of preparation) to roughly one-half those generally applying on woods operations in this Province. It is true that the woods worker requires more calories than the soldier in camp, but he does not require twice as many.

There will be more than 10,000,000 meals served on woods operations and drives this year in Ontario. It is not difficult to see the savings possible through the reduction of meal costs by one cent. From Army experience, I am certain that food costs could be cut by at least 10 per cent (roughly three cents per meal) through the proper training of cooks and the elimination of waste. This could be accomplished concurrently with an improvement in the quality of the meals and a diminution in gastric disturbance caused by excessive quantities of grease and shortening, both of which are difficult to obtain. The possibilities of central baking and cooking, with distribution of food in thermos containers to woods workers, comparable to Army practice, have not been appreciated and no procedure of this kind has been attempted on any considerable scale.

Industry is missing a splendid opportunity by failing to develop a central cooking school where men and women of proper aptitude could be taught to prepare suitable food for woods workers and, through prior arrangement of menus, to avoid the waste which is inevitable when three or more kinds of meat and half a dozen types of pastries are placed on the tables at each meal.

Payment of woods workers by piecework has resulted in many anomalies and much that is detrimental to forest management. Workers naturally demand to be allowed to cut in the best stands, with resultant high-grading of the forests. Poor stands are left to be cut by day-labourers, with few or none in sight because of the high piecework rates. Rates now paid permit a skilled and energetic workman to earn sufficient for his needs by working between 15 and 20 days per month. This reduces the amount of wood produced per man per season, thereby accentuating the labour shortage. Many workers consider that income tax deductions take too high a toll from their earnings after $200 per month or thereabouts has been earned, and consequently desist from what they term "working for the Government". It is almost impossible to get men to work at the less attractive jobs at any wage or piecework rate, as long as the rates for cutting permit them to earn a sum commensurate with their views on income tax and sufficient to enable them to take a few days off during the month to spend it.

I recommend the joint study by representatives of woods labour, industry and the Government, of a more reasonable wage structure than that which presently exists on forest operations. I am convinced that some type of daily or monthly wage schedule would be a healthier basis on which to build than the present piecework system (if it can be called a system), for there are so many variations which may be applied. I

further believe that group incentives for camps or other units can be evolved which will minimize the effect of the reluctant worker.

Evidence was given, by the gold-mining group centred at Geraldton, that men earning rates from $8.00 to $11.00 per day were leaving the mines for woods operations. One large operator gave evidence that he was paying unskilled pieceworkers on pulpwood loading operations $12.00 to $14.00 per day, with a bonus at the end of the season. Pieceworkers taking out poles can easily earn more than that at prevailing rates. Such rates can only arouse consternation amongst skilled mechanics and professional men who spend years acquiring skills which result in lower earnings; unless controlled, they can only start another dizzy spiral of ascending rates which eventually will remove Ontario from competition in world markets.

I subscribe to the idea that a good forest worker requires skill, intelligence and stamina equal, if not superior, to that required by most of his opposite numbers in the mills. His pay and treatment should be commensurate. The hourly rates now earned by many pieceworkers exceed all but the highest rates paid in paper mills. This does not appear to be equitable and an unbiased reconsideration of the situation by both labour and industry is indicated.

I strongly recommend the brightening of living conditions, including more privacy for the individual, and the improvement of recreation facilities in camps so that they may compete in a measure with the drawing powers of the nearest beer parlors. Together with this, an attempt should be made to create forest communities along lines advocated in Chapter XIX.

As mentioned earlier, I also recommend a joint study by the interested groups of an alternative to the present piecework system, and the substitution of a more sensible method of paying workers.

CHAPTER XVII

Measurement of Timber

As mentioned elsewhere, the measurement of timber for payment of stumpage is far from an exact science in Ontario. There are cords of three different contents recognized for the same stumpage rates. Strangely enough, the operator who cuts four-foot unbarked pulpwood and whose practices for that reason normally result in the best utilization, is penalized in comparison with those cutting longer lengths or taking out peeled wood.

The most surprising feature in the measurement problem is the survival of the Doyle rule long after all other provinces have discarded it. Its main effect is to conceal true values and to bonus inefficient and harmful practices. Some license-holders pay stumpage on Doyle rule and sell the product to sawmills on Quebec log-rule which gives a much higher content than the Doyle rule does for the same log.

It was developed as a rule-of-thumb method of measuring large logs and, while it does not give absurd results for logs over 15 inches in diameter, it does result in a very considerable undermeasurement. It has been the official rule in Ontario since 1879.

A comparison with the International 1/4-inch rule, the Quebec (Roy) rule and the New Brunswick rule is enlightening:

Small end diameter of log	Volumes of 16-foot logs			
	Doyle Rule (Ontario)	International 1/4" Rule	Roy Rule (Quebec)	New Brunswick Rule
6"	4	20	20	20
7"	9	30	29	31
8"	16	40	39	40
9"	25	50	51	48
10"	36	65	65	64
11"	49	80	80	80
12"	64	95	97	96
13"	81	115	115	112
14"	100	135	135	130
15"	121	160	157	150
16"	144	180	180	170
17"	169	205	205	198
18"	196	230	231	229
19"	225	260	259	261
20"	256	290	289	300
21"	289	320	320	327
22"	324	355	353	362
23"	361	390	387	376
24"	400	425	423	432

The low values for small logs which the Doyle rule gives is a temptation to operators on Crown lands to cut immature timber because of the large overrun and the amount of slab material made available. It should be emphasized

Small 16-foot logs on a sawmill log-deck. Log sizes may be gauged by comparing with the steel straps which are about five inches wide. Stumpage payable on these logs when measured by the Doyle rule will be less than four cents each. They will each yield about 30 board feet of comparatively low-grade lumber.

that none of the other rules above-mentioned over-scale if the sawmill concerned is efficient.

The absurdity of the Doyle rule in the measurement of small logs is more evident from the following tabulation showing cubic volumes.

One thousand board feet (Doyle rule) of 16-foot logs:

6	inches	in	diameter	contain	1,070	cubic	feet	or 12.1 cords
7	"	"	"		621	"	"	7.1 "
8	"	"	"		442	"	"	5.0 "
9	"	"	"		349	"	"	4.0 "
10	"	"	"		293	"	"	3.3 "
11	"	"	"		256	"	"	2.9 "
12	"	"	"		230	"	"	2.6 "
13	"	"	"		211	"	"	2.4 "
14	"	"	"		196	"	"	2.2 "
15	"	"	"		184	"	"	2.1 "

As mentioned earlier, the values for logs over 15 inches in diameter are not grossly out of line.

I have been told by those who defend the Doyle log-rule that the absurd results it gives are, in effect, rectified by the practice of bidding for stumpage, inasmuch as the size of the logs to be cut is taken into account by the bidders.

I have also been told that the Doyle rule is a good one because it "compensates" the operator who cuts small logs and thereby incurs high costs, though why the Crown should subsidize a practice which, in most cases, is both harmful and inefficient, was not explained. I have found little evidence which would give these defenders general support. In fact, the contrary is often the case. Taking the cutting of spruce sawlogs in the season 1945-46 as an example, I have compared the average size of logs scaled in each Forest District with the average revenue per thousand board feet (Doyle log-rule) for each District. I find that that District in which the largest logs were cut rated seventh (out of 13 Districts) in the revenue received. The District ranking second in order of the size of logs returned the lowest revenue per unit of all the Districts in the Province. The District ranking third in the size of its logs returned the highest revenue per thousand feet of all Districts. The same lack of any consistent relationship between the stumpage received and the size of the logs cut is evident in the case of the other species of timber.

Putting the products of the forests to uses to which they are not well suited always involves an economic loss but, because of the odd results arising from the use of the Doyle log-rule, such losses are greatly magnified in Ontario. For example, at the 1945-46 average rates of stumpage payment, the Government of Ontario sold 1,000 f.b.m. of six-inch spruce sawlogs for $5.74. These logs would make 12.1 cords of pulpwood providing a revenue of $20.31; thus a potential loss amounting to about 253 per cent of the actual revenue was incurred.

1000 f.b.m. (Doyle log-rule) of six-inch logs,

CROWN REVENUE $5.74 (AVERAGE)
6" SAW LOGS MEASURED BY DOYLE LOG RULE

CROWN REVENUE $20.31 (AVERAGE)
SAME WOOD MEASURED IN CORDS.

The corresponding figures for logs of other sizes were as follows:

Diameter of sawlog in inches	Revenue per 1,000 f.b.m. sold	Potential revenue from same material if made into pulpwood	Potential loss of revenue as percentage of actual revenue
7	$5.74	$11.79	106%
8	5.74	8.38	46%
9	5.74	6.62	15%

On the other hand one cord of spruce pulpwood composed of 17-inch logs would bring only $1.67 revenue, while the same wood made into sawlogs would bring a revenue of $3.02; thus a potential loss amounting to about 81 per cent of the actual revenue was incurred.

One cord (or equivalent) of 17-inch logs.

CROWN REVENUE $1.67 (AVERAGE)
ONE CORD OF BOLTS 17" DIAMETER

CROWN REVENUE $3.02 (AVERAGE)
SAME WOOD IN SAWLOGS MEASURED BY DOYLE RULE

The corresponding figures for logs of other sizes were as follows:

Average diameter of pulpwood bolts in inches	Revenue per cord sold	Potential revenue from same material if cut in sawlog sizes	Potential loss of revenue as percentage of actual revenue
15	$1.67	$2.73	64%
14	1.67	2.57	54%
13	1.67	2.39	43%
12	1.67	2.19	31%
11	1.67	1.97	18%
10	1.67	1.72	3%

So, wherever a tree from Crown lands is put to a wrong use, the Treasury of Ontario is the loser—and the Doyle log-rule ensures that this loss will usually be large.

It must be kept in mind that stumpage rates in sawlog agreements, as well as licenses, have been based on the Doyle rule; if, as I recommend, it should be eliminated, this fact should be taken into consideration and corresponding adjustments made in rates.

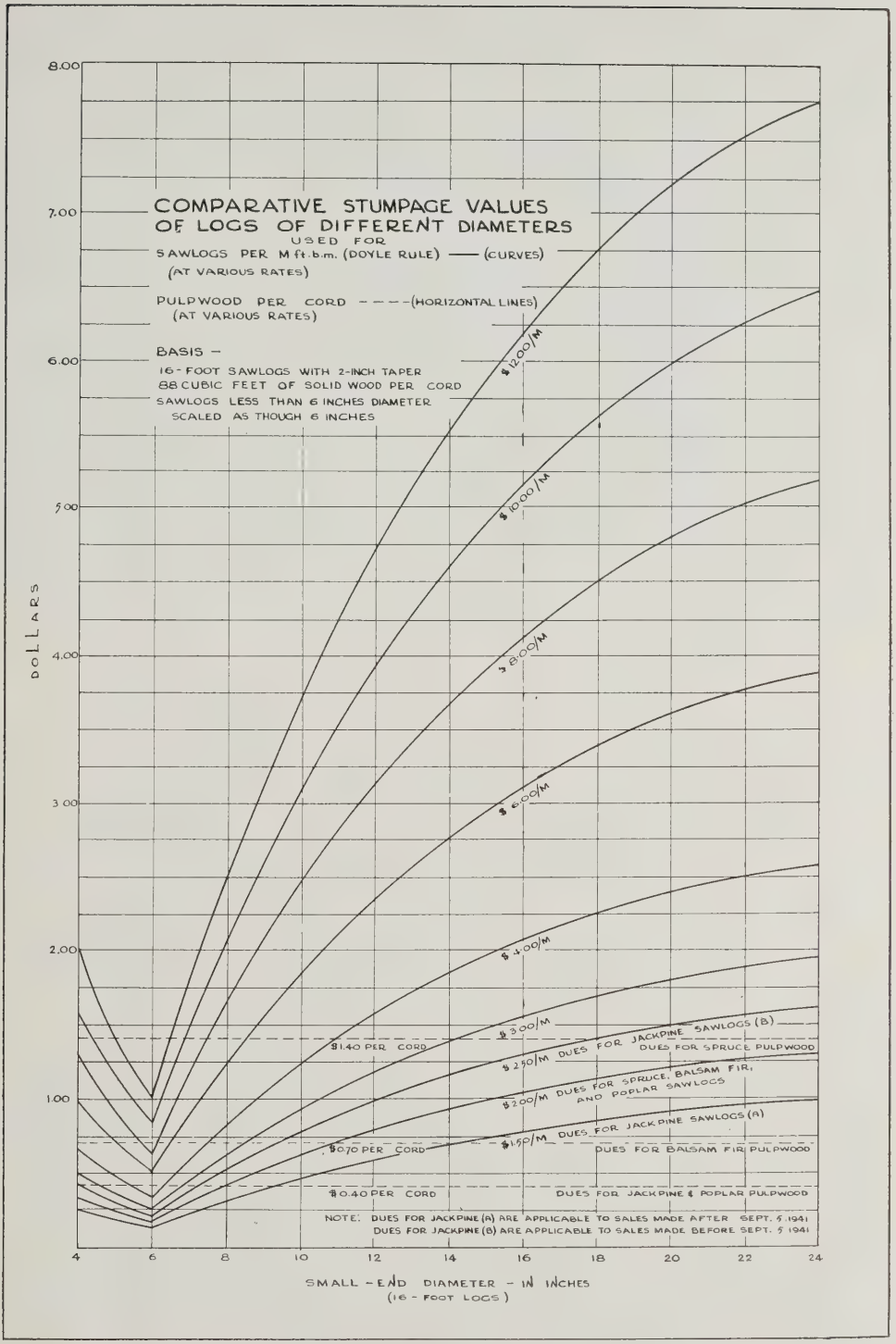
However, in the final chapter of this report I recommend a complete re-orientation of the present concept of the allocation and methods of operating forest resources. I also recommend cubic measurement of all forest products, with a single stumpage rate for each species, regardless of the end-use of the wood. One of the present anomalies is that the lumber industry, with a comparatively low-value end-product, pays a higher stumpage rate per cubic unit of wood for logs over eight inches in diameter than is paid by the pulp and paper industry, which produces end-products of higher value. The curves below indicate the inequalities in existing practices and point the way to more sensible utilization. Logs in the low diameter-classes (under eight inches in diameter) should be utilized for pulp wherever it is possible to divert them to that use and, conversely, larger logs should be diverted to lumber manufacture.

The Chart on the opposite page shows how the relative values of sawlogs and pulpwood change with changing diameters of the logs or bolts. The solid-wood content of a cord is practically unaffected by the size of the bolts it contains, but the solid-wood content of one thousand board feet of logs, when measured by the Doyle log-rule, varies widely with the size of the logs. This chart shows that above a diameter of about eight or nine inches, sawlog operators pay far more for wood than pulpwood operators, while in the case of smaller logs the opposite is the case.

EXAMPLE OF HOW CHART MAY BE USED:

Question: How does the value of spruce sawlogs at, say, $6.00 per thousand feet (Doyle log-rule) compare with the value of spruce pulpwood at, say, $1.75 per cord.

Answer: The horizontal line from the $1.75 point in the left-hand margin intersects the curve marked $6.00/M at the vertical line representing a small-end diameter of about 9¾ inches on the bottom scale. Therefore, sawlogs larger than 9¾ inches in diameter cost more than the same wood cut into pulpwood, while sawlogs less than 9¾ inches in diameter would be cheaper than the equivalent quantity of pulpwood.


COMPARATIVE STUMPAGE VALUES
OF LOGS OF DIFFERENT DIAMETERS
USED FOR
SAWLOGS PER M ft. b.m. (DOYLE RULE) —— (CURVES)
(AT VARIOUS RATES)
PULPWOOD PER CORD - - - -(HORIZONTAL LINES)
(AT VARIOUS RATES)
BASIS —
16-FOOT SAWLOGS WITH 2-INCH TAPER
88 CUBIC FEET OF SOLID WOOD PER CORD
SAWLOGS LESS THAN 6 INCHES DIAMETER
SCALED AS THOUGH 6 INCHES
$12.00/M
$10.00/M
$8.00/M
$6.00/M
$4.00/M
$3.00/M
$2.50/M DUES FOR JACKPINE SAWLOGS (B)
DUES FOR SPRUCE PULPWOOD
$2.00/M DUES FOR SPRUCE, BALSAM FIR, AND POPLAR SAWLOGS
$1.50/M DUES FOR JACKPINE SAWLOGS (A)
DUES FOR BALSAM FIR PULPWOOD
$1.40 PER CORD
$0.70 PER CORD
$0.40 PER CORD
DUES FOR JACKPINE & POPLAR PULPWOOD
NOTE: DUES FOR JACKPINE (A) ARE APPLICABLE TO SALES MADE AFTER SEPT. 1, 1941
DUES FOR JACKPINE (B) ARE APPLICABLE TO SALES MADE BEFORE SEPT. 1, 1941
DOLLARS
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
4
6
8
10
12
14
16
18
20
22
24
SMALL-END DIAMETER - IN INCHES
(16-FOOT LOGS)

Before leaving the matter of the measurement of sawlogs, I want to emphasize most strongly that the abandonment of the Doyle log-rule in favour of a more accurate and equitable method of measurement, coupled with an adjustment in stumpage rates, will do much to promote both efficiency in sawmilling and good forestry practice.

I am well aware that many lumbermen benefitting from the gross underscale by Doyle rule will not acclaim my recommendation, but I am convinced that the proposal I make in the final chapter of this report will far more than offset any loss of privilege Ontario lumbermen will suffer by reason of discarding it. I see no reason for continuing a privilege at the expense of the Crown at any time, but least of all do I approve when, by a rational approach to the whole problem, the interests of both the Crown and the industry can be advanced. If carried out, my recommendations will result in a higher revenue for the Province and lower costs of sawlogs and of sawing to the lumbermen; but—perhaps most important of all to both parties concerned—they offer a bright prospect for the continued existence of this vitally important industry, which certainly is not in evidence to-day.

In any revision of scaling methods, I recommend that the guiding principle be the greatest possible simplification commensurate with results of practical accuracy. I suggest joint study by government and industry of a method by which all logs or bolts will be tallied by full diameters and a series of possibly four grades established at different stumpage rates. Solely for the purpose of illustrating the principle I have in mind, I offer the following examples (the percentages and stumpage rates are only indicative):

Logs or bolts under 10% defective ..... Class A—Stumpage $4.00 per unit.

Logs or bolts over 10% but under 25% defective.. Class B—Stumpage $3.00 per unit.

Logs or bolts over 25% but under 50% defective.. Class C—Stumpage $2.00 per unit.

Logs or bolts over 50% defective..... Class D—No stumpage.

This would simplify scaling and the scaler could be required to mark A, B, C, or D on the log-ends as he scaled, thus facilitating check-scaling. The highest stumpage would then be payable on the better logs, thereby encouraging the utilization of much material now culled and left in the woods.

As mentioned elsewhere, cords are not consistently measured on the same basis by the Department of Lands and Forests. **I recommend that the definition of a cord set out in section 22A of the "Dominion Weights and Measures Act", as passed on 25th May, 1935, be adopted. This states in part that "the cord shall contain one hundred and twenty-eight (128) cubic feet". I further recommend that the stumpage rate charged for peeled pulpwood should be higher than the rate for similar unbarked wood. The difference in rates should recognize, not only the difference in the actual volume of wood contained in a cord of peeled pulpwood as compared with the volume of usable wood in a cord of unbarked wood, but also the waste inherent in peeled wood operations. I consider that the rate per cord for peeled pulpwood should be not less than 15 per cent greater than the rate per cord for similar unbarked wood.**

An unevenly piled skidway of small sawlogs in Western Ontario. Because of the careless piling it would be impossible to measure accurately the lengths or diameters of many of these logs.

So far in this chapter I have dealt exclusively with the units of measurement used in scaling wood in Ontario, but before leaving the subject I should say something about the preparation of wood for scaling. I have commented favourably upon the manual of instructions which sets forth the duties of scalers and the working methods they should adopt. **I recommend that the next edition of this manual set forth the methods which operators should follow in piling logs or pulpwood bolts.** In my recent field inspections I have found many and widespread instances of poor piling of both logs and pulpwood. A large number of such piles were photographed and two of these photos appear as illustrations.

Poor piling practices make the work of the scaler both difficult and expensive, but I am even more concerned over the fact that they are also a possible cause of loss of revenue to the Province. **I therefore recommend that rules be drawn up setting forth the conditions which must be met in piling either logs or bolts, with appropriate penalties for their non-observance. These rules should provide that:**

(a) **One end of all skidways or piles be flush so that both diameters and lengths may be measured.**

(b) **Only one species be piled in each pulpwood pile or, if mixed, stumpage shall be paid as if the contents were all of the species carrying the highest rate.**

(c) **No deductions to be made for faulty piling. (Percentage deductions for poor piling are impossible to check and the privilege**

A poorly built skidway of pine sawlogs. Ends are uneven, thus making proper measurement of either diameters or lengths impossible.

Four-foot wood cut for export. The several species in this pile had to be scaled separately entailing scaling costs equal to, or greater than, the stumpage received.

is open to abuse at the expense of the Province. The remedy for the operator lies in his insistence upon proper piling.)

(d) Short logs be piled on top of larger ones in cases where logs of a different length are mixed on a skidway.

Pulpwood used in Ontario or exported through Ontario ports of exit may come from either Crown lands or private lands within the Province, or even from outside the Province. Once pulpwood has been scaled and started on its way to its destination, one stick becomes indistinguishable from another and after it has been moved from the landing where it was scaled, it is virtually impossible to tell whether or not it has been assessed for export levy. In my studies concerning permits or clearances for export, I have discovered several possible methods by which an operator could defraud the Government. I found no specific instances where this had been done, but I believe the possibility should be removed.

I therefore recommend that every stick of wood cut for export be distinctively marked, at the expense of the operator, either by the use of paint or by end-stamping with a hammer. This practice is carried out on certain streams in Quebec, for sorting between companies, and is entirely feasible.

CHAPTER XVIII

Land Classification

Contrary to the opinion of many, land classification is a very complex problem which cannot be solved by sending a soil specialist and a map-maker into a district to delineate those areas which may properly be allocated to agriculture, forestry, game preserves, or other uses.

It is simple enough to indicate what will grow best on various soil-types but the problem has other important angles which must be considered if the results of soil classification are to be of true value. Those undertaking such surveys should know whether pressure for agricultural production or some other consideration is more important than the need for conservation of timber, game, and recreational and other facilities.

Before opening an area for settlemt, the administration of the day should decide what needs will govern in its development. If the decision is wisely taken, much suffering and many disappointments may be avoided. Thousands of abandoned or semi-abandoned farms in the Clay Belt and west of the Lakehead bear testimony to the fact that something more than a capacity to produce farm crops is necessary to maintain settlers on land after it has been denuded of timber. Problems of markets, roads, schools and social life are of paramount importance, and neglect to weight these factors properly can only result in later distress and disillusionment.

Such neglect in the past has resulted in colonist developments sprawled over wide areas, when greater agricultural production, if that was the aim, could have been obtained from a much smaller and more compact area located on more productive soils close to the amenities offered by population centres. One agricultural scientist testified that thirty good farmers located on some of the better soil close to Cochrane could grow more farm produce than is now produced by hundreds widely scattered throughout that whole region.

The same witness pointed out that agricultural soils in Southern Ontario are graded A, B, C, D, E, etc., in conformity with their productive capacity, but in Northern Ontario, while the same system is used, grade-A soil is comparable in productivity only to grade-C soil in Southern Ontario. In other words, the best Clay Belt soils would only rate third class in Southern Ontario where farms in organized communities may be purchased for the value of the buildings upon them, or even for less. If more farm produce is required, it can be obtained more quickly and more cheaply by diverting effort from marginal farmlands to farmlands in Southern Ontario now underdeveloped for lack of farm labour.

The above discussion, I believe, indicates to some extent the responsibility of the administration in opening land for settlement. It should first decide whether or not such settlement is desirable or necessary and, if so, whether agricultural or other considerations should be paramount. Having made these

Rich farming country typical of a large part of Old Ontario.

decisions, the soil expert and the geographer may then be sent in to classify the land on a basis which will ensure satisfactory social and economic results.

It must always be kept in mind that, if soil and topography are suitable, forest lands which have been operated by forest industries may immediately be devoted to agriculture, but the reverse is not the case when lands have been cleared or devastated unwisely for actual or alleged farming pursuits; it may take upward of a century to restore them to their proper use.

The pictures in this chapter graphically portray the long-term possibilities of land classification. Farms of the better type have for generations fed into our national life a stream of citizens of which any nation might be proud. Poorer soils produce citizens who generally deteriorate progressively with succeeding generations to a point where they are problems, not assets, to their communities.

Land classification and description cannot in themsevles change land usage, and sound practices will develop on a wide scale only when a majority of those concerned are educated to a point where they understand the problems posed and endorse the solutions. With this end in view, governments should make educational material available and provide the machinery necessary to implement the action which should be taken.

Without a stabilized policy concerning the opening of lands for settlement and the machinery to implement it, soil specialists, with their economists and map-makers, are working in the dark and subsequent administrative action taken may well nullify their best efforts.

For the future, therefore, I recommend a further tightening of the control over new settlements. If a new area is to be settled, the Government should decide its main purpose and then the soil specialist and others may sensibly prepare the plans upon which it may expand. In this way, the best possible facilities may be provided in the way of roads, schools, churches and integrated community life. Such action would be almost a complete reversal of past processes which tend toward a waste of resources, poverty, disillusionment and, worst of all, a lowering of human morale. Three generations in comparative isolation on unfruitful soil unfortunately seem to raise a high percentage of morons. There is little excuse for continuing to permit people to settle on land which is likely to produce citizens of low quality.

I recommend a Province-wide classification of forest lands, delineating areas as follows:

(1) Soils which under present standards will never be suitable for agriculture and which should be protected from such encroachment.

(2) High-quality, easily developed soils where the topography permits of agriculture and where the climate will normally allow cereals and vegetables to mature.

(3) High-quality soils as in class (2), where climatic conditions normally prevent cereals or vegetables from maturing.

Starvation farming. Poor land-use through attempting agriculture on forest-type land. West of Denbigh, Lennox and Addington County.

(4) **High-quality soils where topography, drainage or clearing problems render them likely to be uneconomic as compared to more favourably situated farms.**

(5) **Marginal soils where some adverse condition, or combination of adverse conditions, makes the success of agriculture doubtful.**

Combined with and superimposed upon the above classifications should be data concerning the possibilities of the development of fish and wildlife or tourist enterprises. Such considerations may radically change the outlook on many marginal sites. It is only by properly weighting all these factors that sensible land-use may be decided upon.

CHAPTER XIX

Forest Communities

Much has been said during recent years concerning the necessity for and possible advantages of forest communities where woods workers could live with their families, or at least be with them at week-ends. It has been suggested that the woods workers of the communities should be employed by local forest industries during a major portion of the time, and that they and their families might cultivate small holdings and during off seasons, engage in fishing, hunting, guiding, handicraft enterprises, or other occupations inherent in forest life, or that these occupations might even form their major source of income.

There is little ground for argument as to the desirability of communities of this nature or that they would probably serve as a potent force in reversing the flow of rural citizens to the larger population centres, a benefit not to be ignored. Each community would help to stabilize woods labour and assure that a nucleus of well trained woods workers would always be available in the vicinity of local forest industry. Pleasant, healthy and gainful occupation would be provided for many, with consequent advantages to both employer and employee alike.

Some of the projects suggested have not dealt entirely in economic realities, and it is unlikely that they could be carried out without loading an unjust burden on the taxpayers.

It has been proposed that each charter member of a community be granted an area of timber land on which he could cut timber for sale to industry. Houses, with modern amenities, would be grouped in villages. Roads necessary for exploiting the area would be developed to open up the various minor watersheds. All members of each family, if they desired, could engage, at least a part of the time, in various enterprises, including handicrafts. A paid manager or overseer would co-ordinate and direct all the enterprises of the community.

In my opinion, this type of forest community can never succeed, for various reasons, some of which are as follows:

(a) The capital cost of houses, roads, schools, churches, communication systems and miscellaneous service would average considerably more than $5,000 per family.

(b) Land-tenure would be an almost insurmoutable barrier, except on a tenant basis. If deeded outright to a member, no matter how careful the initial selection might be, there would be no guarantee that his offspring would desire to lead the same kind of life, or for that matter that he would have male or any descendants of the physique or aptitude for forest enterprise. In such instances, title would necessarily pass to another citizen who might be of a most undesirable type.

(c) The per capita cost of building, maintaining and snow-plowing the extensive road-systems envisioned would be well above the average for rural Ontario because of the greater mileage per family.

(d) The necessary government assistance per worker, in opening up such a community, would amount to more than that given to returning war

veterans; this would, I believe, be inequitable and unpopular. The temptation, too, to reduce city relief costs by transferring the recipients to forest communities might well prove too great to be resisted.

I am firmly convinced that the type of forest communities which will succeed will be those sponsored by the operators. They can be strategically placed with reference to watershed development, and may be built by the operator to rent at cost, or co-operatively built, with the operator supplying materials at cost and the individual supplying the labour.

In either event they can be so located that mechanical transport can pick up the workers in the morning and return them to their homes in the evening. (In some locations this may prove feasible only at week-ends.) The advantage of this system is the elimination of many bush camps of the barrack type, with their inevitable colony of clerks, cooks, choreboys, etc. Some of the larger organizations in British Columbia now practice this system to good advantage and with very considerable economy. One operation I visited on Vancouver Island in 1946 maintained in a company-camp at the highway only 60 out of roughly 240 woods employees. Only one cookery and one clerical set-up serviced the whole operation, although cutting was scattered over a considerable area, in some places up to 20 or more miles from the community. The scheme advocated in the final chapter lends itself admirably to a development of this nature.

Whatever the type of the forest community of the future, I believe that the present barrack-type of camp will eventually disappear, except for the housing of seasonal labour whose employment will diminish with the development of communities. **I recommend that operators give thought to building attractive recreation-rooms, with provision for social activities and amenities.** Such recreation-rooms have been provided by many mill organizations in places where the needs are not so great, but their value in maintaining employees' morale has become apparent to senior executives.

Work in the woods can and should be one of the most attractive forms of manual labour. It can be made so if as much effort and imagination is applied to the problem as that applied by competing industries in order to attract workers to urban enterprises.

CHAPTER XX

Comment on Swedish Forestry

A widely held idea persists that conditions affecting forestry in Ontario are similar to those in the Scandinavian countries, particularly Sweden, and that their forest practices could be adopted in Ontario. I wish to dispel this idea; the differences are far more numerous and important than the similarities. They fall under several headings:

(1) In the matter of tenure of lands, over 90 per cent of Ontario's forests are owned by the Crown, while only 20 per cent of Sweden's are in that category and they are located in the more inhospitable climate of the north.

(2) Ontario has an inland continental climate, in contrast to Sweden's maritime weather conditions which more closely resemble the climate in Nova Scotia. Annual precipitation in Ontario and Sweden is comparable, but the distribution of rainfall during the summer months is generally better in Sweden than in Ontario. This, coupled with the higher humidity found in a maritime climate, results in lower fire-hazards than are normal in this Province.

(3) Ontario has seven conifer species reaching maturity over a range of 60 to 150 or more years. Sweden has two conifer species of practically equal maturity-age, one of which, Scotch pine, has not proved satisfactory when attempts have been made to bring it to maturity in Ontario.

Southern Ontario has ten or more native hardwood species of commercial importance, again varying widely in maturity-ages. These reduce to two in number in the more northerly areas. Sweden has only two important hardwoods, birch and poplar, except for a small area in the south where beech, ash, oak and alder are found. Hardwoods are not as widely distributed or as important in the forest economy of Sweden as they are in Ontario.

It can therefore be appreciated that the silvicultural problems posed in developing wise cutting-methods are much more complicated in Ontario than in Sweden.

(4) Sweden has a large number of rivers flowing from her western border to the sea. Nowhere in that country are the forests more than two or three miles from drivable streams which carry the products to tidewater. Ontario is far from having similar conditions; in fact in many areas hauls to drivable water are several times as long as in Sweden.

(5) Sweden has road systems, built over the centuries, which traverse all her forest areas, except the most northerly ones where transportation conditions and, incidentally, forestry methods are not much superior to our own. Ontario needs some thousands of miles of forest roads

before forestry methods on a scale comparable to those practised in Sweden can be attempted.

(6) Sweden has lower woods wage-rates than Ontario where the rates are influenced by and are now equal to, if not above, those paid in mining and the heavy industries generally. Wage rates have a profound effect on the intensity of forest management economically feasible for the operator to remain in business.

(7) Sweden has 90,000 square miles of forest out of a total area of 173,000 square miles, one-third of which is water, rock or bog. Her forest industries employ 94,000 people out of a total population of 6,500,000 and account for 45 per cent of the value of the Nation's exports. As a result, her people are all "forest conscious" and realize that their national life depends upon continuously productive forests. There is no such consciousness in Ontario where a vast majority of the public know little of their forest heritage and are apparently indifferent concerning its future.

(8) The density of the average stand in Sweden's forest areas is nearly ten cords per acre (845 cubic feet) and the annual increment per acre is calculated at 28 cubic feet (just under one-third of a cord). The comparative figures for Ontario are unknown, although it would appear from tests made that a considerably higher annual increment than is mentioned above is possible in the southern portions of this Province.

It must not be supposed that forest practices in Sweden are completely developed and inflexible. Considerable differences of opinion exist there concerning regeneration and cutting practices which are still under development and vary widely between the south and the north. The services of technically trained foresters on both the forest-engineer and the forest-ranger level are much more widely used there than here and their whole administrative set-up is different.

CROWN OWNERSHIP OF MILLS

The Swedish Crown came into possession of several sawmills and a sulphate-pulp mill during the depression years and now owns eleven mills which are operated as joint-stock companies and are required to show a four per cent profit. The extent of its competition with private industry in extracting, processing and marketing forest products is therefore sufficient to act as a finger on the pulse of the market.

CROWN REGULATIONS ON PRIVATE LANDS

The Crown does not interfere directly with the disposal of timber by private owners but, by tradition, there has been some control over cutting extending back, in some cases, well over 100 years. Laws have been enacted:

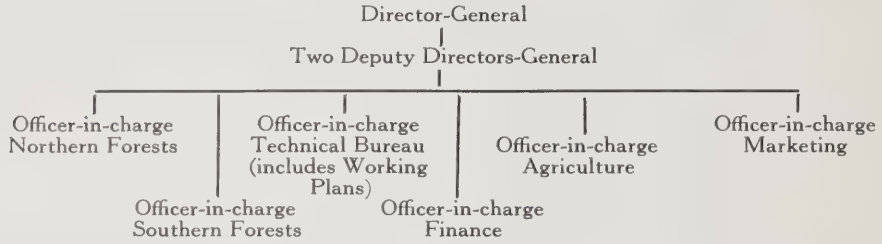
(1) prohibiting the further acquisition of forests by private companies,
(2) prohibiting clear-cutting,
(3) prohibiting measures likely to endanger reproduction, and
(4) protecting the fauna of the forests.

FOREST ADMINISTRATION

The Ministry of Agriculture deals with all forest lands, whether owned by the Crown or by private agencies, except church lands which are not extensive. Administration is under a Director-General who is head of the Royal Forest Department.

Day-to-day problems are managed mainly by semi-independent boards set up by the Ministry. There are two education boards, one which supervises higher forest education and the Forest Research Institute, and the other the intermediate forest schools. Private forestry comes mainly under County Forest Protection Boards, of which there are twenty-five. The work of all these boards is co-ordinated by a central board at Stockholm—The Royal Forestry Board. The Director-General has a seat on all boards, thus assuring their proper inter-relationship.

The Royal Forest Department also administers Crown agricultural lands. Its organization is as follows:



Under these officers come 10 territorial conservators and about 110 officers of the superior service, most of whom are in charge of forest divisions or the equivalent. All officers down to and including the territorial conservators are located at Stockholm and set the policy, which is then left for the division officers to carry out with a free hand.

The main purpose of County Forest Protection Boards is to see that farmers' forests are properly managed. Most of the larger companies have their own foresters and manage their forests very well. Some Boards have as many as six trained foresters and three times that number of trained forest rangers, in addition to the seasonal staff. Their duties include marking for felling, giving advice on drainage and road-making, the discouragement of grazing and the operation of nurseries.

The above statistical and administrative data are gleaned from a report made in the summer of 1946 by a group of British foresters, headed by H. G. Champion, C.I.E., Professor of Forestry, Imperial Forestry Institute, Oxford University. This group visited Sweden and travelled widely through the forested areas and visited the forest industries, accompanied by leading experts in the various lines. It is printed in the Empire Forestry Review, Vol. 25, No. 2, 1946.

The vast gap between Swedish conditions and those of Ontario in the matter of making use of trained personnel is readily apparent. It will take several years of maximum enrollment in Canadian forestry colleges if the technical assistance for government and industry in Ontario is to approach, even on a modest scale, Sweden's wide use of trained personnel. Only a start can be considered to have been made in secondary forest schools (ranger schools) with

the recent establishment of an initial unit at Dorset. This type of educational institution should be much more widely developed, and this could readily be done in connection with the experimental forest areas recommended elsewhere in this report.

I am convinced that, althought we have not yet trained sufficient foresters to practice management on a level comparable with what is done in the Scandinavian countries, particularly Sweden, it would be wise for us to adopt many of their industrial practices, particularly with regard to mill operation. **I recommend a programme of visits to the mills of Northern Europe during the next few years.** Such visits would be more likely to be productive of conservation measures and economic practices than any attempt to put Scandinavian silvicultural methods into practice in Ontario before we have the necessary personnel. At the same time, only intensive research into the best Scandinavian, German or other continental or American practices which are adaptable to Ontario, will evolve a system more likely to suit our forest conditions than any yet developed.

CHAPTER XXI

Forest Operating Companies

A SOLUTION

Throughout this report there have been frequent references to a plan which would be unfolded in the final chapter. As a preamble, I first deem it necessary to set down certain conclusions forced upon me as the joint result of a wide-spread survey of field conditions, a prolonged session of public hearings and a critical analysis of the confusing array of existing forest legislation, regulations, agreements, licenses, permissions and permits.

CONCLUSIONS LEADING UP TO SOLUTION OF PROBLEM

(1) I do not consider that it is, or ever will be, possible to achieve the rational development of forest resources or to maintain our present industries under the existing plan of limit allocation, with the confusing and conflicting agreements and conditions in force.

(2) In view of the varying conditions in existing agreements, it never will be possible to apply any over-riding regulations which would standardize them to any considerable degree.

(3) It is not possible for either of the contracting parties to fulfil some of the conditions recited.

(4) Most of the agreements are very one-sided and are indicative of extremely keen bargaining. Export agreements are based on an exception to the general law intended to prevent the very practice provided for in the agreements.

(5) Many people on both sides of the international border believe that there are still vast areas of virgin timber awaiting development. I regret to say that the only area in which I found any considerable quantity of mature timber in blocks of considerable extent, outside areas covered by existing licenses and agreements, is in the Patricia region, north of Lac Seul.

Enough timber for perhaps two moderate-size pulpmills and a few medium-capacity sawmills still remains unleased in that district. (I am presuming the construction of pulp mills by Long Lac Paper Company Limited and Huron Forest Products Corporation in their respective areas.)

(6) I am convinced that unless vigorous remedial measures are soon taken, the lumber industry will continue to diminish in importance to such an extent that before twenty-five years it will be classed as a minor industry, which would be a major tragedy. If this should happen, it will very severely affect every farmer, home-builder, mine, railway or industrial enterprise which uses lumber or timber. A high mortality

rate amongst secondary industries dependent upon sawmills may also be anticipated.

(7) Single purpose operations in our forests should no longer be tolerated. They are a symptom of the absence of co-operative effort between the various groups within the forest industries. The resultant waste is a reproach to all concerned and must be eliminated in any rational development of the forests. The lack of co-operative effort between members of the same group is painfully evident in many cases across the Province.

(8) There is a lack of uniformity in the application of forest regulations and a province-wide indication of insufficient staff to perform the work expected of them.

(9) There is a widespread feeling that some individual operators have been favoured more than others and that departmental action has been slanted to the benefit of some groups. The text of Chapters IX and XV gives substance to complaints on this score.

(10) Except in white pine, red pine and yellow birch stands, there is little overmature timber in the portions of the Province now operated.

(11) I have not heard a word spoken in favour of the Doyle rule, except by those who purchase stumpage from the government or woodlot-owners on that basis.

(12) Throughout this report there have been recommendations concerning the expenditures of considerable sums of money. The purpose of most of this outlay is the rehabilitation of the forests of Southern Ontario which is necessary for the continuity of both rural and urban enterprise. In addition, increased budgets are required to supply the technical and administrative staff, without whom inspection and supervision of Crown lands will not be adequate or efficient.

Unless the public is willing to spend large sums of money on forestry in the next quarter century, efforts toward improvement, or even maintenance, of the present forest conditions will continue to be little better than a gesture. In this connection, the financing of forestry in Southern Ontario should not be confused in any way with the activities on or revenues from Crown lands in other parts of the Province.

In view of the preceding conclusions, I shall now set down certain conditions and principles which I believe should govern any action toward future forest legislation or operational methods. This might form the nucleus of a forest policy for Ontario.

PRINCIPLES APPLIED IN SOLUTION OF PROBLEM

(1) In future Government action, the principle of sustained yield must ever apply. Any other course will spell eventual disaster to many of our existing industries and the communities they support.

(2) Legislation and regulations should apply equally to all operators. There must be adequate penalties, uniformly applied, for evasion of regulations or waste of forest products. On the other

hand, those operating on sound silvicultural systems should be given every encouragement to develop the highest possible yield from their areas.

(3) In any area cut over, all usable species must be removed to the full extent of the capacity of existing markets to absorb them. Naturally, when available markets cannot absorb the total production of a given species, operations may be concentrated on those stands which may be extracted most advantageously.

(4) Overmature timber must be removed before cutting in younger stands may be permitted. The cutting of small areas of younger, though not immature timber occurring in overmature stands should obviously be permitted, particularly if it will reach overmaturity before the next cutting-cycle.

(5) All cut-over areas must be stocked, either by natural or by artificial means, with a potential stand equal to or better than that removed both as to species and density. Otherwise a continual lowering of the quality of our forests is inevitable.

(6) In the case of other industries such as iron-ore mining, the producer does not quote different selling prices depending upon the ultimate destination of the product, whether it be used for making ploughshares or rails, pen nibs or battleships, but treats all users alike. I consider the Government should similarly standardize its stumpage rates per cubic unit of any given species, regardless of the final disposal of the timber. Natural economic forces would then come into play and the logs or bolts would automatically find their best market.

(7) I am certain that the method of levying government charges on forest operations could be simplified and improved. I recommend that, instead of several different assessments, only two be applied.

One of these, which might be termed "forest rental", would cover all items of expense which continue regardless of the size of the annual cut. It would include the revenues necessary for the maintenance of staffs at Headquarters and in the field, together with the cost of their various activities such as research, forest protection (including fire fighting), air service, etc. Needs could be estimated with accuracy and rentals set for a period of five or more years. I suggest that any portions of the estimated fire fighting costs remaining unexpended in a particular year should be carried forward to succeeding years within the period, as a cushion against disaster. At the end of the period a rebate should be made or, if a deficit exists, the assessment for the ensuing period should be raised to reimburse the Treasury.

The other charge might be called "stumpage" and would include government revenue for timber cut and all items dependent upon the quantity of wood cut. Zones of special stumpage rates could, if necessary, be established to take care of wide differences in operating conditions or for other reasons

such as Government tolls on roads or for other improvements constructed for limit holders at public expense. Variations of this kind should only be permitted on the broadest possible basis, such as differentiating between timber on watersheds draining into the Great Lakes and timber on watersheds draining into James Bay or Hudson Bay, with no effort made to adjust differences between individual stands or operators. Endless argument and inconsistencies would result if the basis were to be narrowed.

Stumpage rates could properly be raised or lowered in conformity with the economic cycle applying to forest industries. I see no reason why industries, which in past times of stress have applied for and received rate-reductions from the Department, should not, within reason, share periods of prosperity with the same Department. There are sound arguments for raising provincial charges on timber in times of high federal taxation on industrial profits. While there is no quarrel with the idea that the Federal Government should derive such benefits in wartime, I point out that low provincial stumpage rates are reflected in enhanced federal revenues from taxes on profits and excess profits.

(8) I recommend that all wood, whether logs or bolts, be measured on a cubic measurement basis. The Doyle rule has really only one purpose, that of confusing the seller, and elastic contents of cords have no place in a well ordered system of measurement. For four-foot wood, a cord 4′ x 4′ x 8′ could be converted on a basis of 88 cubic feet if the wood is unbarked and 104 cubic feet if barked.

(9) Speculation for profit on timber stumpage should be eliminated. Limit holders with a surplus of wood beyond their needs should be required to dispose of such wood at the government dues applying, plus a fair return for carrying charges, say five cents per acre per year, or a maximum of one cent per cord or its equivalent per year, during the time ground rents, fire protection, etc., have been paid. Such a regulation would confine corporations to a profit on the manufacture of their products and prevent any on timber speculation.

(10) The amount of the export levy should be whichever is the greatest of:

(a) $2.00 per cord, or

(b) The difference between the average cost of United States wood delivered to the United States mill and the declared cost of the wood imported from Ontario delivered to the said mill, or

(c) The difference between the average cost of United States wood delivered to the United States mill and the average cost of Ontario wood for domestic consumption, plus export profit (as mentioned later), plus the freight to the United States mill at published rates.

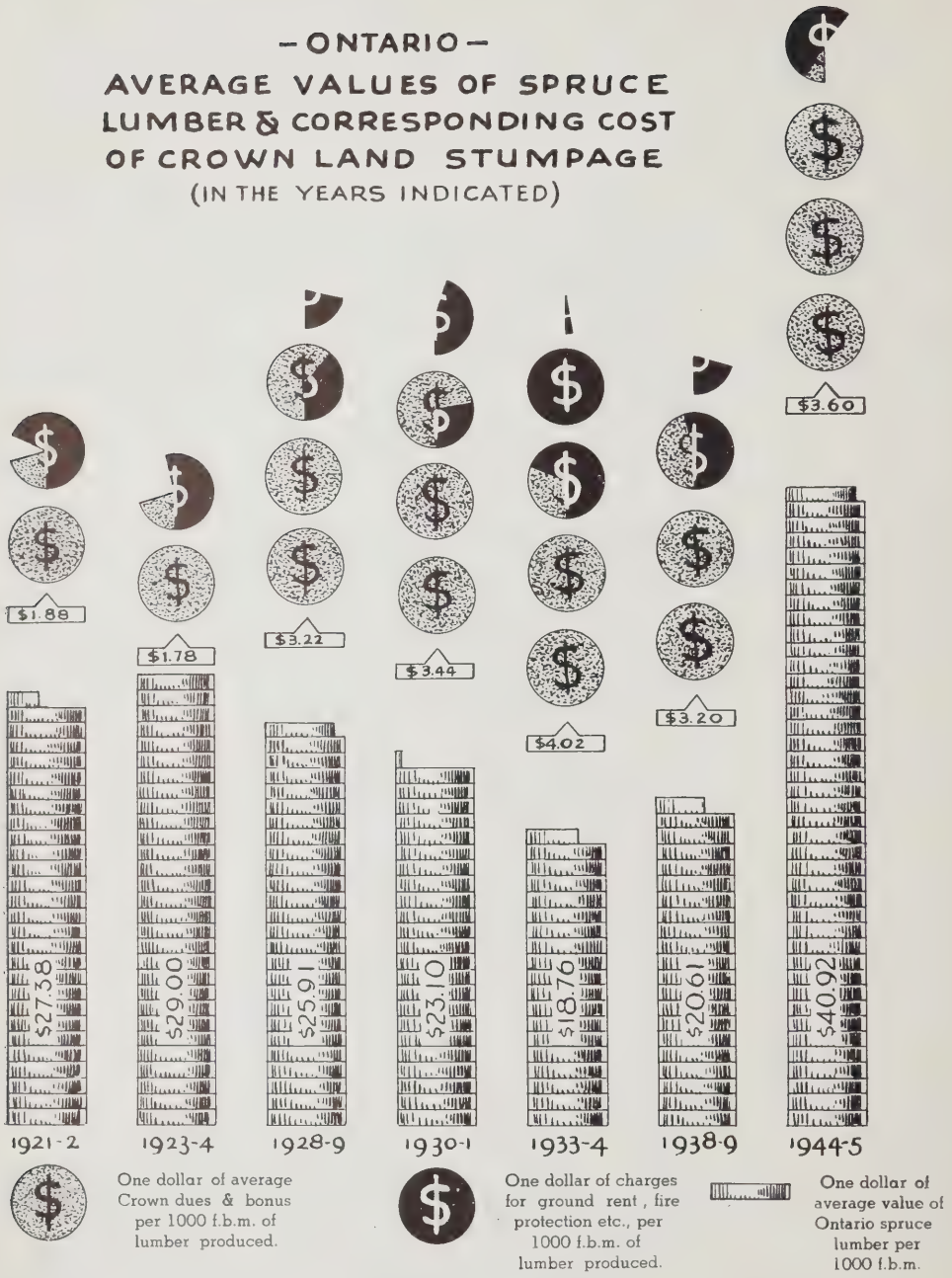


Chart showing a comparison of lumber values and stumpage costs of spruce in Ontario in certain significant years.

A memorandum submitted by a representative of the importing mills in the Lake States indicated that Canadian wood is desperately needed for the mills in question. There was no hint that this wood should be delivered more cheaply than home-grown wood.

(11) Each area must be developed to its full growth capacity, with cutting confined to the older stands, except under unusual circumstances such as insect epidemic or fire loss. An operator who holds more limits than his mills require must operate the limits to their full capacity for regrowth. On the other hand, an operator must not cut more than the annual growth on his limits. Until better standards are developed, the cut in coniferous stands on watersheds draining into the Great Lakes should not exceed 10 cubic feet per acre per year and in mixed stands five cubic feet of conifers and five cubic feet of hardwoods. On watersheds draining north or west, the cut should not exceed nine cubic feet per acre per year.

ADVISORY COMMITTEE TO MINISTER

It is submitted that any legislation or any forest policy, no matter how sound and workable, can be nullified by Government or Ministerial action. Many submissions presented at the public hearings recommended the formation of a Commission which would be above politics and which would provide continuity and impartiality to forest policy.

I am far from convinced that Commissions are infallible or that their members can survive unless their policies are essentially in conformity with the view of the administration. Experience of Hydro Commissions in Ontario and Quebec during the past 10 or 12 years would indicate the fallacy of the impression of continuity. After all, the administration of the day is responsible for the care of provincial resources and it cannot escape its responsibilities for the forests by delegating matters of policy and management to a non-elective Commission.

There is little assurance that a Commission, however carefully selected or well intentioned, will solve all its problems correctly. As an example, I might mention the fact that the Workmen's Compensation Boards of Ontario and Quebec follow diametrically opposed policies concerning merit and demerit rates for good or bad accident experience, although such rating embraces one of the main fundamentals of accident prevention.

I am very firmly convinced that public interest will best be served by the departmental system under a Minister responsible to the people. I am just as firmly convinced that measures should be taken to prevent a Minister from reversing existing forest policy or promulgating new policies and only informing the general public several years later.

To indicate the need for some type of check I point out that such policy-reversing changes have occurred in the past without the general public being aware of them for several years. It is difficult to take suitable remedial action in such matters when they appear in a departmental annual report sometimes three years after the event.

In order to provide reasonable continuity of forest policy when changes of government, or even changes of Ministers, occur and to

guard against possible unwise or precipitate Departmental action, I recommend that an Advisory Committee to the Minister of Lands and Forests be appointed. Its membership should consist of one representative of each of the following groups or interests:

Education	**Forest engineers**	**Mining**
Railways	**Pulp and paper industry**	**Building industry**
Labour	**Lumber industry**	**Finance**

This Committee, which should have a permanent secretariat, should hold periodical meetings, probably monthly, for which members would be paid fees commensurate with directors' fees paid by large industrial corporations. At these meetings, or at special emergency meetings, the Minister may lay any problems, on which he wishes advice, before the Committee. Conversely, members might ask for explanations of any Departmental action taken or contemplated. The Minister need not necessarily accept the advice of the Committee, but could receive much benefit from their discussion of and reaction to any major projects he might have under contemplation.

A group of the nature outlined would bring a wide cross-section of business and professional experience to the service of the Minister and would, I believe, achieve that continuity of policy so widely desired and advocated. Appointments might be arranged so that three members would retire each year, although any member so retiring might be re-appointed if such action was agreed upon by the Government and the group concerned. Practically all groups represented have associations which could nominate suitable candidates for membership. The representative of education could properly be the Dean of the Faculty of Forestry at the University of Toronto.

If stability and continuity of forest policy is assured through the appointment of a Committee of the nature described, then I recommend that the Government of the Province should adopt a completely new concept of the allocation and operation of Crown lands. Unless a reallocation of cutting rights of the nature outlined is adopted, I am convinced that the present unbalanced and wasteful system of exploitation will cause a continuous and progressive deterioration of forest resources. Only a major reversal of existing policies can supply a remedy.

I consider that any attempt to provide a solution by applying new regulations to the infinite number of conflicting conditions in present agreements is doomed to failure. No partial solution can meet the needs of the situation. Half measures can only postpone the evil day; I therefore offer none.

There are those who will point out that dire prophecies concerning the exhaustion of forest resources have been made over a long period of years and that they have all grossly exaggerated the situation. In reply to those critics, I would point to the decline of the lumber industry and the expansion of the pulp and paper industry to our westerly boundary and into the smaller timber in the northern areas along the timber line. The last forest frontiers are now well in sight from present holdings and no new horizons will develop. Expansion of forest holdings is coming to a close, and I hope we are now entering the era of sensible operation of our remaining resources.

ONTARIO ROYAL COMMISSION ON FORESTRY

MAP No. 6

POSSIBLE DIVISIONS
—FOR—
FOREST OPERATING COMPANIES

LIMIT ALLOCATION

My proposal is as follows:

All licenses, agreements, permissions and permits shall be suspended for a period of not less than ten years. In return, the Government will assure to the present limit holders a supply of wood in perpetuity up to the present capacity of all domestic mills by a pooling of the resourses of all provincial Crown lands and by establishment of a policy which will allow further expansion only when it has been established beyond question that wood is available without possibility of interference with domestic enterprises. Future extensions, commensurate with the productive capacity of the tributary forests, will be provided for, if justified, as soon as the true capacity can be ascertained. Exporters will receive quantities of wood commensurate with the productive capacity of their present limits, but not necessarily from the areas their agreements now cover. **I recommend that no export be permitted from an area which will prejudice the continued economic life or legitimate expansion of any domestic enterprise.** There is, however, enough material for all, including sawmills and exporters, if it is properly harvested and distributed.

I contend that an assurance of standing timber in perpetuity is of more value to a limit holder, for purposes of financing, than his present insecure tenure under legislation which is now in the Statutes of the Province.

All Crown forest resources having been pooled, their sensible redistribution becomes simple and the major defects of the present system can be eliminated. I suggest that the Province be broken down into 12 areas along the lines generally indicated on Map No. 6. The areas shown are only indicative and may be varied very considerably, not only with regard to boundaries but also in numters, without seriously affecting the soundness of the scheme.

FOREST OPERATING COMPANIES

Of the areas indicated on Map No. 6 each contains several watersheds and parts of watersheds and in general supplies a central group of forest industries. Watersheds from which the wood will be delivered by rail are integrated with adjoining watersheds. Individuals or corporations, who hold limits or operate mills using the various forest products, would unite to form one Forest Operating Company in each of the areas shown. This would combine and co-ordinate all woods operations carried on within the area for any purpose whatsoever.

I believe that the right of the individuals and corporations concerned to purchase wood from the Operating Company should depend upon the holding of shares in that Company and that the quantity of such wood should be in proportion to the number of shares held.

ALLOCATION OF SHARES IN FOREST OPERATING COMPANIES

It is unnecessary to work out here all the details of the organization of these Forest Operating Companies but shares, with the ancillary right to purchase wood, could be allocated on a combination of two factors:

(a) Average mill consumption or export shipment in units of wood by each individual or corporation over a five-year period or, in the case of mills which have not operated for a total of five years, average annual consumption.

(b) Area of limits now held by the individual or corporation within the watersheds included.

Allocation of shares and wood entitlements to each unit of industry concerned is entirely feasible and equitable on the above basis. Such allocation will smooth out differences and eliminate unsound forest practices such as over-cutting by mills too large for the limits which supply them, or under-cutting on limits left partially dormant because they are too large for the mills they supply.

Shares should carry a fixed dividend which would be a charge against the wood cost. Payment for shares could be made in cash or by shareholders turning over to the Operating Company their equipment, camps, improvements, surveys, working plans, etc., all of which would necessarily be evaluated on a standard basis by a referee or board of referees.

EXPANSION OF FOREST INDUSTRIES

No new industries or expansions of existing industries beyond those already under way should be permitted until it is ascertained that there is sufficient wood available to justify such expansion. When it becomes apparent that there is a surplus of wood over current needs in any Forest Operating Company's area, the surplus could be allocated by the Department of Lands and Forests to the industry which will provide the utmost in continued employment in the vicinity or, if necessary, could be diverted to some other Operating Company in whose area a shortage of wood was found to exist. The allocation of surplus wood should naturally be carried out after consultation with the industries concerned and I can see where the Advisory Board to the Minister could be of great value in advising on these allocations or dealing with complaints which will be inevitable where large quantities of forest products are concerned.

If the right to purchase wood from the Operating Company is to be dependent upon the holding of shares, provision will have to be made for the compulsory sale of shares, at a fixed price, by individuals or corporations which cease to utilize, for a period of say two years, the quota of wood to which they are entitled.

PROVINCIAL REPRESENTATION ON BOARDS OF DIRECTORS

The Forest Operating Companies would be managed and administered by boards of directors. **I strongly recommend that the Province should have a representative on the board of each such Company.** It is realized that having a member on such a board might lull the public into a false sense of security but I believe that the over-all advantages of such representation more than overbalance the disadvantages. In any event, the scheme is entirely feasible without government representation on the board.

I would further suggest that the other members of the directorate should be appointed from the various groups represented on the following basis:

(a) Where pulpwood-using industries have consumed the bulk of the wood produced in the preceding five years:

Pulp and paper mill group	2 directors
Sawmill group	1 director
Pole and tie operators' group	1 "
Exporters' group	1 "
Small operators' group	1 "

(b) Where sawmill operators have consumed the greater part:

Sawmill group	2 directors
Pulp and paper mill group	1 director
Pole and tie operators' group	1 "
Exporters' group	1 "
Small operators' group	1 "

With such representation for the various interests, no particular group would be able to dominate the situation. Directors, as soon as elected, could proceed to select operating officials from amongst the best of the personnel of all the groups represented, and actual forest operations could then be undertaken.

OPERATING CONSIDERATIONS

In the initial stages of the Forest Operating Companies, cutting would probably proceed in the same areas from the same camps and with much the same personnel, and changes would gradually be undertaken over a period of several years. It is emphasized that Forest Operating Companies could, and probably would, use contractors, company camps with small operators, or even allot to families small watersheds to cut over where circumstances so dictated, and that the system used would be governed by a combination of the social, silvicultural and economic considerations.

Consideration might well be given to the question of providing compensation to limit holders for ground rent and fire protection charges paid in past years on limits turned over to the Operating Companies.

Preparation of a long-term working plan would be a responsibility of the company, to be completed within three years. Approval of this working plan by the Department of Lands and Forests would be necessary before its adoption.

All Forest Operating Companies should be required to organize along similar lines and all data and returns concerning the forests would be standardized to the fullest possible extent, eliminating the present difficulty encountered in trying to assemble comparative data between regions or operators.

If, after a reasonable period of trial, say ten years, the original limit holders should wish to return to the present uneconomic and unorthodox conditions of forest operation, the question could be studied in the light of intervening experience. If, on the other hand, any limit holder for selfish or contractual considerations, should refuse to enter into the project, the Department has sufficient authority written into his present agreement to ensure the operation of the limits involved to their full capacity and on sound forestry principles requiring the use of each type of timber for its most appropriate purpose. Priority in the use of waterways for wood transportation and in similar rights should be allotted to Forest Operating Companies, in view of their greater importance in the economic well-being of the Province.

ADVANTAGES OF PROPOSAL

At this point, the advantages of the above proposal begin to emerge. Not the least of these would be the emancipation of forest operation from the short-sighted policy of many mill executives who normally know little or nothing of the inescapable effects of unsound forest practices and are mainly concerned with immediate costs. Forest utilization would be conducted under the ablest

and best trained woods personnel available within the various groups. Cutting would be carried out in conformity with plans prepared in collaboration with foresters who would protect against jeopardizing future forest conditions for the sake of present dividends.

Mill executives would only need to calculate their wood requirements and send a requisition to the Forest Operating Company, in which they hold an appropriate share. Tentative requisitions for raw material could be made as of January 1st in each year, to permit the Company to plan its season's work. Final requisitions could be made, with the necessary financial adjustment, at August 1st. I would suggest provision of working capital for the Company by means of monthly advances by the operators at agreed rates, say $1.00 per cord per month, commencing with the placing of the tentative requisition.

As soon as tentative requisitions are placed, the Forest Operating Company could arrange its season's work to best advantage, purchasing supplies and equipment, opening secondary roads, clearing streams, etc.

When cutting starts, the needs of each type of industry would be integrated to the operation of each section of the forest. Materials suitable for poles and ties, sufficient to meet the needs, would be cut into suitable lengths for that purpose. Only straight logs in the larger sizes would be allotted to sawmills. The vexed question of the definition of a sawlog would be solved. It is my belief that nothing under 10 inches small-end diameter need be diverted to sawmills in order to maintain present production. However, if that estimate should prove inadequate to meet needs, the minimum diameter could be dropped to nine inches. If it gave indication of providing an excess over the needs for sawlogs in any area, the diameter could be raised to 11 inches. The situation would thus be always under complete control.

Jack pine could be diverted to kraft mills and to sawmills. Spruce, balsam and jack pine could go to the pulp and paper mills in the proportions which they can utilize. Poplar would go to soda-pulp mills, groundwood mills and sawmills, and so on.

PRIORITY TO DOMESTIC MILLS

Priority in regard to timber in any area should go to domestic mills. If a company has insufficient growing material to feed its mills in perpetuity, it may call on an adjoining Forest Operating Company which has more than its domestic demand. When better silvicultural measures restore the local balance, a readjustment may be made. When domestic mills are assured of supplies in perpetuity, then there can be less argument against the export of pulpwood within the annual growth of the Province, provided always that the product manufactured from the exported pulpwood is not competing in the market of domestic mills, or robbing them of a future economic source of wood supply.

Operating Companies should deliver wood to their own domestic mills at cost (which would include the fixed dividend on stock). Wood produced for other Companies should be permitted to carry a nominal profit over the cost to domestic mills of possibly 50 cents per hundred cubic feet, and wood produced for export should carry a higher rate of profit, possibly $1.50 per hundred cubic feet.

PROFITS FROM MANUFACTURING PROCESSES

The duty of the Forest Operating Companies would lie in delivering ample and suitable wood to domestic mills at the lowest possible cost commensurate

with sound forestry practice. Profit making by the member companies would result from the efficient conversion of this wood to its various end-products, rather than from luck or influence in the allotment of their limits, or from high-grading or otherwise abusing the Province's resources.

JOINT DRIVING OF STREAMS

The sorting of logs, except for species, would be eliminated and drives on streams would all be joint drives. The significance of this statement will be realized when I mention that this co-operative idea would do away with ten out of the eleven sweeps or rears annually carried out on the Nipigon River.

COMPARISON OF COSTS

Comparison of wood production costs could be made by a central organization, such as the Ontario Forest Industries Association. It could tabulate the costs from the various Forest Operating Companies, which would be kept in a standard manner, and this information could be circulated periodically to all companies. Costs out of proportion to the conditions prevailing would become apparent and the companies could take appropriate remedial action.

OVERLAP AND DUPLICATION ELIMINATED

Overlapping in purchasing, storekeeping, accounting, engineering and administrative effort generally would be eliminated. Central repair shops and wood-working plants equipped with the most efficient machinery, and staffed by highly skilled mechanics, would be feasible. Reserves of equipment, stores, food and fodder could be drastically reduced and handled in a more scientific and economical manner than is now the case.

LABOUR CONSIDERATIONS

Labour Unions would find their problems simplified in having a smaller number of large operators to deal with in negotiating collective agreements and should find it much easier to service such agreements than under present conditions. The hiring of men would also be simplified through central agencies who could hire large numbers and dispatch men in special trains at excursion rates, instead of continuing the present piecemeal practices.

NEW AND DORMANT LIMITS DEVELOPED TO CAPACITY

The proposed scheme would bring into active production millions of acres of forest lands belonging to the Crown, but not included in existing licenses and agreements. Many of the areas are in themselves too small or too remote from population centres to attract industry to them under the present limit-allocation plan, but would fit admirably into the broader scheme of operations suggested in this chapter. A glance at Map No. 8 indicates the locations of the areas mentioned above.

JOINT TOWING OPERATIONS

The Forest Operating Companies whose products are delivered to the Great Lakes should form a Great Lakes Towing Company which would organize and carry out the movement of wood on the Great Lakes. This would completely integrate the movement of wood from stump to mill and eliminate overlap in effort and duplication of services and equipment.

GOVERNMENT ADMINISTRATIVE ADVANTAGES

From the standpoint of government administration, the proposal would eradicate nearly all of the detail work which is now most troublesome and time-consuming. Instead of hundreds of operators, they would be dealing with about a dozen. Stumpage rates and operating regulations would be standard across the Province, instead of being fogged with hundreds of varying conditions as at present. The boundaries of the Forest Operating Companies' areas and the administrative districts of the Department could be made to coincide so that each district office would have to deal with only one or at most two companies. Accounting need not lag more than a week or two behind the scaling of wood and the recording of stumpage dues or other forest charges. The result would be that figures necessary for the preparation of the annual report of the Department could be available within a month of the date decided upon as the end of an operating year.

The greatest and most lasting effect of the proposed scheme, however, will be derived from the full and rational development of each forest area along sound silvicultural lines. Timber removal will be from limits which should logically be cut over, rather than from areas dictated by limit lines or individual company policy.

POSSIBILITIES

Both the Government and limit holders are justified in asking what are to be the benefits of such a radical change of method in the treatment of Crown lands and their development.

With the fusion of all groups and with management controlled by the most efficient operating personnel available, all woods operations should be raised to a standard comparable with the best carried on previously. There are enough efficient operators to supply this leadership. Superimposed on the general increase in efficiency of operation, will be the savings from the elimination of separate drives and duplication in management, supplies, maintenance and repair of equipment, engineering and items of a similar nature.

Judging from the waste of effort and material which I observed on widely distributed operations, I am convinced that if the system advocated is adopted, the average cost of delivered raw materials can be reduced by the equivalent of $2.00 per hundred cubic feet, without any reduction in wages. This would save some $6,000,000 per year for forest operators generally. For the sawmilling group, costs of sawing would be reduced by at least $3.00 per M feet board measure, due to the elimination of small, crooked and defective logs; while average grades of lumber produced would be raised by $5.00 to $6.00 per M feet board measure, a further benefit of $1,500,000 or $2,500,000, a generous portion of which should be passed on to the public.

But the above more or less immediate benefits do not create the main value in the scheme, which lies in an increased production from our Crown lands, with an improvement rather than a deterioration of the forest resources involved.

The Report of Forest Resources of Ontario compiled in 1930 indicates 110,000,000 acres under forest protection. Of this:

(1) 39,450,000 acres were classed as muskeg, barrenland, water, or recent burn,
(2) 28,110,000 " " " coniferous stands,
(3) 34,460,000 " " " mixed stands,
(4) 7,980,000 " " " hardwood stands.

The following estimates are extremely conservative, as I have not taken into account any growth on item (1) above; I have assumed a growth of 10 cubic feet per superficial acre on watersheds feeding the St. Lawrence drainage, Rainy Lake, and Lake of the Woods; I have used a figure of nine cubic feet per acre for the Central Divide (height of land) area, except its Kenora extension; and for the Clay Belt and Kenora extension of the Central Divide, I have used seven cubic feet per acre per year, not so much because of a difference in the rate of growth, as because of the amount of marginal forest land, the stands on which are of doubtful economic value.

Mixed stands have been estimated to produce equal quantities of softwoods and hardwoods, and hardwood stands have been estimated to produce 10 cubic feet per acre per year, except in the Clay Belt and the Kenora extension of the Central Divide, where 9 cubic feet is the figure used.

The above figures are roughly one-third of the average applied to Swedish forests, and less than one-quarter of that taken from German forests.

Applying the above figures, I find that an annual cut properly distributed over our Crown lands could amount to 391,800,000 cubic feet of conifers and 247,100,000 cubic feet of hardwoods.

Assuming 25 per cent of the above conifer cut would be suitable for sawlogs, and 15,000,000 cubic feet suitable for ties and poles, we could produce annually the following:

540,000,000 f.b.m. lumber,
2,000,000 ties,
250,000 poles,
3,200,000 cords of pulpwood or other products.

Assuming 15 per cent of all hardwoods would be suitable for lumber, we could produce the following annually:

185,000,000 f.b.m. lumber,
10,000,000 cubic feet veneer-logs, poles, ties, etc.
1,500,000 cords of pulpwood,
770,000 cords of fuelwood and other products.

In addition to the above, there are now roughly 41,000,000 f.b.m. of lumber and 180,000 cords of pulpwood produced annually on private lands and this could be stepped up to 110,000,000 f.b.m. and 300,000 cords, if the plans suggested are carried out.

Recapitulation

	(1) Present Production (average) Crown lands and private lands	(2) Possible annual cut (1950)
Lumber	600,000,000 feet board measure	835,000,000 feet board measure
Pulpwood	2,180,000 cords	5,000,000 cords
Ties	1,500,000 pieces	2,0000,000+pieces
Poles	125,000 pieces	250,000+pieces
Veneer-logs, etc.	4,000,000 cubic feet	10,000,000 cubic feet
Fuelwood	1,885,000 cords	2,500,000+cords

Tremendous overcutting of firewood is occurring on Ontario's private woodlots; if they are not to be more or less completely ruined, most of the fuelwood used in the next few decades must come from Crown lands, sawmill waste, etc.

As indicated in Chapter VI on Private Lands, a continually increasing quantity of wood from that source is feasible and this, added to the increased cuts later possible on Crown lands as a result of better cutting methods, will provide a substantial addition to the figures in column (2) above.

The possibilities outlined above, together with the human values which may be perpetuated and enhanced as a result of adopting the proposed scheme of management and operation of Crown lands are, I believe, too great to be pushed aside because of selfish considerations. Perpetuation and improvement of our forests, together with their dependent industries and all the secondary benefits of tourist attraction, recreation, control of stream flow, maintenance of water levels, increase in fish and wildlife, are all within our grasp if we have the courage to reach out and seize them.

I maintain that this proposal is not visionary. It is practical and based on sound principles and common sense. To those who are well satisfied with forestry matters as they are, it may come as a shock. I believe that such people need a shock. After an exhaustive study of prevailing forest conditions, I am convinced that it is necessary to protect a probable majority of operators against their own folly in wasting forest resources which are the life blood of their industries. **I therefore recommend that the principles, if not the details, be adopted.**

APPENDIX A—IDENTIFICATION OF SUBMISSIONS

The following is a list of the briefs presented before the Commission:

NAME	ADDRESS	READ BY
Ontario Provincial Government Departments		
Department of Lands and Forests	Toronto	
Deputy Minister (F. A. MacDougall)		J. F. Sharpe
Accounts, Division of		
General		J. G. McMillen
Timber Acconnts		P. B. McLaughlin
Land Tax		Geo. Hinton
Air Service, Division of		G. E. Ponsford
Fish and Wildlife, Division of		Dr. W. J. K. Harkness
		H. H. MacKay
		L. L. Snyder
		Prof. A. F. Coventry
Forest Protection, Division of		T. E. Mackey
Land and Recreational Areas, Division of		F. J. Sullivan
Law, Division of		F. J. Sullivan
Operation, and Personnel, Division of		P. O. Rhynas
Reforestation, Division of		E. J. Zavitz
Tree Seed Extracting Plant		R. W. Carman
County Forests		A. B. Wheatley
Farm Woodlots		I. C. Marritt
Research, Division of		R. N. Johnston
Forest Regeneration		A. P. Leslie
Soil Survey		G. A. Hills
Surveys and Engineering, Division of		F. W. Beatty
Timber Management, Division of		J. F. Sharpe
Department of Planning and Development	Toronto	A. H. Richardson
Federal Government Departments		
Department of Agriculture (Science Service, Division of Botany and Plant Pathology)	Ottawa	A. W. McCallum
Department of Agriculture (Science Service, Division of Entomology)	Ottawa	Dr. M. L. Prebble
Department of Mines and Resources		
Dominion Forest Service	Ottawa	D. A. Macdonald
Forest Products Laboratories	Ottawa	T. A. McElhanney
Forest Insects Control Board	Ottawa	E. J. Menard
National Research Council (Subcommittee on Forest Tree Breeding)	Ottawa	J. L. Farrer
Cities, Towns, Municipalities and Counties		
Fort Frances, Mayor of Town of	Fort Frances	[1]
Geraldton, Corporation of Town of	Geraldton	W. F. Draper
Haliburton, Provisional County of	Minden	Mr. Rogers
Halton County	Milton	[1]
London, Corporation of City of	London	Mayor F. G. McAllister
Mining Municipalities of Northern Ontario, Association of	South Porcupine	V. H. Evans
Peterborough County Council	Peterborough	M. H. Johnston
Port Arthur, City of	Port Arthur	Mayor C. W. Cox
Renfrew County Council, Reforestation Committee of	Pembroke	H. J. Chapeskie
Waterloo County Council	Waterloo County	Mr. Huehn
Boards of Trade and Chambers of Commerce		
Alexandria Board of Trade	Alexandria	D. A. McDonald
Eastern Ontario Associated Board of Trade and Chambers of Commerce		D. A. McDonald
Port Arthur Chamber of Commerce	Port Arthur	G. H. Young
Port Arthur Junior Chamber of Commerce	Port Arthur	K. Dennis
Sault Ste. Marie Board of Trade	Sault Ste. Marie	H. N. Anderson
Smiths Falls Chamber of Commerce	Smiths Falls	D. A. McDonald

Name	Address	Read by
Political Groups		
Co-operative Commonwealth Federation (C.C.F.), Ontario Section of the		
Brief	Toronto	F. O. Robinson
Supplementary Brief	Toronto	C. L. Coburn
Labour-Progressive Party, Ontario Committee	Toronto	R. Stevenson
Public Utilities		
Bell Telephone Co. of Canada	Montreal	H. F. Bush
Canadian National Railways, Tie and Timber Department	Montreal	[1]
Canadian Pacific Railway Company, Purchasing Department	Montreal	L. E. Peever
City of Port Arthur, Public Utilities Commission	Port Arthur	R. B. Chandler
The Hydro-Electric Power Commission of Ontario	Toronto	Dr. O. Holden
Trade Associations and Trades Unions		
Canadian Lumbermen's Association	Ottawa	W. J. LeClair
Canadian Manufacturers' Association, Ontario Division	Toronto	Thomas E. Boyce
Canadian Pulp and Paper Association		
Brief	Montreal	R. M. Fowler
Supplementary Brief	Montreal	[1]
Fort William Trades and Labour Council	Fort William	J. Currie
Furniture Manufacturers' Association	Toronto	C. V. Fessenden
International Brotherhood Pulp, Sulphite and Paper Mills Workers (Local No. 92)	Fort Frances	T. A. Gladu
Lumber and Sawmill Workers' Union No. 2995	Timmins	B. A. H. Magnuson
Ontario Forest Industries Association	Toronto	C. R. Mills
Ontario Mining Association	Toronto	N. F. Parkinson
Ottawa Retail Lumber Dealers Association	Ottawa	P. T. Davis
Wholesale Lumber Dealers Association Inc.	Toronto	H. J. Luck
Conservation, Recreation, and Professional Associations		
Canadian Forestry Association Inc.	Montreal	Robson Black
Canadian Society of Forest Engineers		
Northern Ontario Section	Kapuskasing	E. Bonner
Northwestern Ontario Section	Port Arthur	E. H. Reeves
Ottawa Valley Section	Ottawa	W. M. Robertson
Southern Ontario Section	Toronto	Mr. Thompson
Federation of Ontario Naturalists	Toronto	Prof. T. F. McIlwraith
Hunting and Field Archers of Ontario	Toronto	R. J. Mitchele
Men of Trees	Toronto	[1]
Ontario Conservation and Reforestation Association		
1 Brief	London	Watson Porter
4 Briefs	Ottawa	H. S. Arkell T. A. Dolan
Ontario Federation of Anglers and Hunters	Toronto	Dr. A. B. James
Ontario Horticultural Association	Guelph	J. E. Carter
Parks and Recreation Association of Canada	Niagara Falls	J. Pearson
Thunder Bay District Fish and Game Association	Fort William	[1]
Toronto Anglers' and Hunters' Association, Inc.	Toronto	F. H. Kortright
Educational Bodies		
Ontario Agricultural College, Department of Soils	Guelph	Dr. G. N. Ruhnke
Sault Ste. Marie Board of Education	Sault Ste. Marie	J. S. Foulds
University of Toronto, Faculty of Forestry (3 Briefs)	Toronto	Dean G. G. Cosens Prof. T. W. Dwight R. C. Hosie
Agricultural Organizations		
Cedar Hill (S.S. No. 8) Farm Forum	Cedar Hill	S. Fulton
Lanark County Federation of Agriculture		A. E. Blair

Name	Address	Read by
Miscellaneous Organizations		
Lumber and Pulpwood Operators and Producers of other Forest Products of Cochrane Area	Cochrane	A. E. Wicks
Northern Outfitters' Association	Sudbury	J. A. MacNab
Ontario Command, Canadian Legion B.E.S.L. (2 Briefs)	Toronto	W. T. Burke
Quetico-Superior Council	Minneapolis, Minn	E. C. Oberholtzer
Rehabilitation Council of City of Owen Sound (3 Briefs)	Owen Sound	Dr. N. Douglas
Toronto Convention and Tourist Association	Toronto	T. H. R. McNally
Corporations other than Public Utilities		
Canadian Splint and Lumber Corp. Ltd.	Pembroke	W. R. Beatty[3]
Consolidated Paper Corp. Ltd	Pembroke	W. R. Beatty[3]
Dominion Cellulose Limited and National Cellulose Company Limited	Toronto	W. S. Gibson
Eddy Company, E. B.	Hull, Que.	J. W. Paterson
Hammermill Paper Company	Erie, Penn.	M. Cochran
Hard Rock Gold Mines Limited	Geraldton	A. E. Cave[3]
Howard Smith Paper Mills Ltd.	Montreal	[1]
Kemp Edwards Ltd., D.	Ottawa	[1]
Little Long Lac Gold Mines Limited	Geraldton	A. E. Cave[3]
MacLeod-Cockshutt Gold Mines Limited	Geraldton	A. E. Cave[3]
Magnet Consolidated Gold Mines Limited	Geraldton	A. E. Cave[3]
Marathon Paper Mills of Canada Ltd.	Marathon	H. P. Klinestiver
Milne & Sons Limited, William	North Bay	D. W. Milne
Mountjoy Timber Co. Limited	Timmins	J. A. K. Reid
Newaygo Timber Co. Limited	Port Arthur	H. S. Mosher
Northern Paper Mills Ltd.	Green Bay, Wis.	A. K. McNaughton
Northern Wood Preservers Ltd.	Port Arthur	R. J. Prettie
Pembroke Shook Mills Ltd.	Pembroke	W. R. Beatty[3]
Pigeon Timber Co., Ltd. and Great Lakes Lumber and Shipping Ltd. (Brief and Supplementary Brief)	Fort William	E. E. Johnson
Pulpwood Supply Co.	Long Lac	A. F. Buell
Twelve Producing Gold Mines in Kirkland Lake and Larder Lake Area	Kirkland Lake	A. Harris
Upper Ottawa Improvement Co. Ltd.	Ottawa	D. A. Gillies
Whitmore Lumber Co., W. N.	Deux Rivieres	[1]
Individuals		
Avery, B. F.	Espanola	[1]
Bawden, H. N.	Toronto	H. N. Bawden
Clark, Donald A.	Port Arthur	D. A. Clark
Cox, Charles W.	Port Arthur	C. W. Cox
Crossley, T. Linsey	Toronto	T. L. Crossley
Dennison, William	Toronto	W. Dennison
Dexter, J. M.	Burritts Rapids	[1]
Douglas, Thomas O.	London	T. O. Douglas
Eckardt, Dr. B. C.	London	Dr. B. C. Eckardt
Gillies, J. D.	Newbury	J. D. Gillies
Gowan, J. E.	Geraldton	J. E. Gowan
Hambleton, Jack	Toronto	[1]
Hipel, N. O.	Preston	N. O. Hipel
Irwin, John C. W. (2 Briefs)	Toronto	J. C. W. Irwin
Kaulbeck, O. A.	Port Arthur	O. A. Kaulbeck
Langstaff, A. R.	Spencerville	[2]
Larson, R. H. (Fort Frances "Times" Ltd.)	Fort Frances	R. H. Larson
Lehtinen, O.	Fort William	O. Lehtinen
Moran, Frank B. (Brief and Supplement)	Port Arthur	F. B. Moran
Newton-White, E.	Charlton Station	J. C. W. Irwin
Omejer, Major Odegard (Norwegian Consul)	Toronto	[1]
Smith, James B.	Toronto	J. B. Smith
Start, W. D.	Kenora	W. D. Start

[1]Brief not read by a sponsor at a public hearing of the Commission.
[2]Brief read into the record by the Counsel for the Commission.
[3]Read on behalf of several joint sponsors.

Letters were received from the following individuals:

Devitt, A. W.	Kitchener
Ekman, Carl M.	Winnipeg
Foley, Gerald R., and Grier, Kenneth S.	Lansdowne
Henderson, A. B.	Brockville
Henderson, Miss Mary Jane	Montreal
Hesman, Walter	Golden Valley
Hickling, Mrs. Jessie	Yearley
Hope, Mrs. George	(Unknown)
Howard, Rev. A. L.	Meaford
Kingscote, A. A.	Guelph
Knapp, Harold	Maberley
McDougall, Lorne	Belleville Chamber of Commerce
Reeves, E. H.	Toronto

APPENDIX B—IDENTIFICATION OF WITNESSES

In addition to those presenting briefs, the following individuals presented verbal testimony before the Commission:

Acheson, Keith
Addison, P.
Amidon, Geo.
Anderson, Mr.
Avery, B. F.
Backus, John
Baird F. F. (Dr.)
Baldwin, Geo.
Ballantyne, J. P. S.
Banner, E. L.
Barker, Mel
Barker, Roy
Beck, Mr.
Bertrand, J. P.
Blackburn, F. A.
Brien, W. H. C.
Brodie, J. A.
Bruce, Lloyd
Calder, Ross
Caldwell, J. B.
Cameron, D. Roy
Campbell, C. B.
Case, Mr.
Clark, E. J.
Davis, Clark
Delahey, Geo.
Delahey, W. A.
Docker, W. M.
Douglas, Robert T.
Durrell, W. J.
Faber, Mr.
Fenwick, A. L.
Fiskar, U. W.
Fulton, John S.
Gardner, F. G.
Gimby, W. E.
Godwin, Gordon
Greenwood, W. B.
Haight, H.
Hambleton, J.
Harvey, G. I.
Headley, Mr.
Hesman, Walter
Hilborn, P. R.
Holmes, A. A.
Hughes, H. R.
Irwin, C. H.
James, Thos. J.
Johnson, R. E. L.
Kensit, N. M.
Lahti, J. L.
Larose, Ferdinand
Lee, Roger
Lemay, P. V.
Lenz, Major W. E.
Lewis, Mayor Stanley
Little, Walter
Lloyd, Mr.
Lowe, E. H.
MacDonald, Fred R.
MacQuarrie, E. M.
McAllen, C. J.
McCullough, G. A.
McGonigal, G. I.
McManus, J. J.
McMillan, N.
Mallory, A. D.
Marsden, S. E. P.
Meyers, G. F.
Morison, M. B.
Mulloy, G. A.
Newman, F. S.
O'Mara, P. J.
Pennock, J. D.
Pepler, W. A. E.
Perdue, J. G.
Porter, Watson
Rathwell, M.
Read, A. P.
Reeves, E. H.
Reise, Fred
Ross, K. G.
Sawyer, O. E.
Secord, Dr.
Shaw, Geo.
Sherrett, J. A.
Sintzel, F. C.
Snider, F. E.
Steele, W. E.
Stewart, Milton
Thurston, Willard
Walkinshaw, C. A.
Ward, D. H.
Ward, E. L.
Wardrope, G. C.
Welsby, G. H.
Whitmore, W. H.
Woodman, F. W.
Young, C. B.
Zavitz, C. H.

Ontario Royal Commission

on

Forestry

GLOSSARY OF TERMS

Used in 1947 Report

GLOSSARY OF TERMS USED IN REPORT

NOTE: This glossary is intended primarily for the layman and therefore strict scientific accuracy is sometimes subordinated to simplicity. It defines the various technical or semi-technical terms and uncommon words used in the report which are not in everyday use and which in many cases are not to be found in a standard dictionary. The definitions given cover only those meanings which are applicable to the terms defined in the sense in which they are used in this report. Terms which are self-explanatory or which are fully defined in the body of the report are not included.

Advance-reproduction (or **advance growth**). Young trees which have become established before cutting operations are begun.

Age-class. One of the intervals into which the range of ages of trees is divided for classification. Thus, a 60-80 year age-class means that the trees in that class range from 60 to 80 years of age.

All-aged. A term applied to a stand in which, theoretically, trees of all ages up to and including those of the maximum natural age of any species in the stand.

Allowance for trim. The permissible excess (by regulation not more than six inches) of the actual length of the sawlog over the recognized length it is deemed to be for the purpose of collection of stumpage. The recognized lengths rise by one-foot intervals from eight feet. Some allowance is necessary so that the lumber sawn from a log may be trimmed squarely and accurately to one of the accepted standard lengths with a minimum of waste.

Annual growth. The volume of wood on a given area added in one year by reason of the growth in height and diameter of the trees on the area. Also called the annual increment.

Ash (Fraxinus). Four species of this genus of deciduous tree occur in Ontario, of which black ash (**Fraxinus nigra**) is the only one occurring to any extent north of the portion of the Province known as Old Ontario. White ash (**Fraxinus americana**) is particularly useful in the manufacture of sporting goods and for other purposes where toughness is an important quality.

Balsam or balsam fir (Abies balsamea). A coniferous tree to be found growing in almost all parts of Canada except the extreme western areas. It is suitable chiefly for pulpwood and sawlogs.

Banksian pine. See **Pine.**

Berth (or **timber berth**). A block of publicly-owned forest land on which the right to cut timber is leased or granted.

Bid. That part of the stumpage rate paid for Crown-owned timber in Ontario which is set at the discretion of the successful bidder by public auction sale.

Birch (Betula). Three species of birch are native to Ontario. Of these yellow birch (**Betula lutea**) is the most valuable but has a more limited range, being found chiefly in Old Ontario, along the northern shore of Lake Huron, and in the Algoma district and to a lesser extent along the international border west of the Lakehead. It is a generally useful hardwood in demand for furniture, flooring, plywood, etc. White birch (**Betula papyrifera**) is found practically throughout the forests of Ontario. It is used to some extent for

lumber and handles and other small woodenware. Grey birch (**Betula populifolia**) is commercially unimportant in Ontario and is found only in the eastern part of the Province.

Black Spruce (Picea mariana). See **Spruce.**

Blow-down. A tree, or a stand of trees, overthrown by the wind.

Blow-sand (area). Land consisting of light sandy soil subject to erosion by the wind. See also **Soil-drift.**

Bolt. A short log cut to a special length convenient for making barrel staves, shingles, spools, etc. The term may also be applied to individual pieces of pulpwood in short lengths. It is usually prefixed by the name of the article which is to be made from it, e.g., stave-bolt, shingle-bolt, etc.

Bonus. A premium payment in addition to a standard rate. Thus, in Ontario the term applies to that part of the stumpage rate paid for Crown-owned timber which is in excess of the standard basic rate (dues) but excludes the portion bid. It may be fixed by departmental action or by negotiation with the lessee. In New Brunswick the term applies to an annual payment for the retention of cutting rights on Crown lands in addition to the established "ground rent". Also a payment or subsidy paid to defray part of the cost of, or to encourage, a desirable practice or undertaking.

Boom. A series of logs or timbers fastened together end to end by chains or cables for the purpose of: (a) forming artificial channels in streams or rivers through which logs or pulpwood may be floated or "driven" with a greater measure of control, or (b) encircling a quantity of float-logs or pulpwood so that the whole mass can be held safely in storage or can be towed by boats. The individual components of a boom are called "boom timbers".

Borers. Types of forest insects which tunnel into the wood, or between the bark and the wood, of standing or felled timber.

Box shooks (or **shook**). Pieces of lumber cut to specified sizes and to be later made into boxes.

Browse. Leaves, twigs and shoots of trees and shrubs available as forage for animals.

Buck. An adult male deer.

Budworms. Types of insects which at one stage in their life-cycle feed on the leaf-buds of trees and the leaves themselves causing partial or complete defoliation and often the death of the trees so injured.

Bulldozer. Primarily, but by no means exclusively, a road-building machine consisting of a crawler-type tractor fitted with a dirt-moving blade which is mounted horizontally across the front and which can be raised or lowered mechanically. Hence, "bulldozing" is the act of using a bulldozer.

Burn. An area over which a forest fire has swept and on which a new forest is not yet established.

Butt. The base of a tree or a term used to describe a log containing that part of a tree. Also the lower end of a log in relation to its original position in the tree.

Carrying capacity. The greatest population of any kind of wild animal which a given area can sustain in food, shelter, health and relative safety. Also the measure of the ability of a stream or river to carry a drive.

Car stakes. Poles about three to six inches in diameter and nine to twelve feet long used to secure loads on open railway freight cars.

Cedar (Thuja occidentalis). An evergreen tree found growing chiefly on swampy land in all parts of Ontario except the extreme northern portion. Particularly useful for poles, posts, shingles, and other products calling for durability or lightness. Also a favorite winter browse for deer.

Check-scaling. In the measurement of timber, checking-scaling bears the same relationship to scaling, as in accounting practice, auditing bears to book-keeping. That is to say, it is a checking and testing of the original measurements and their compilation. See **Scaling.**

Chemical-pulp. Forms of woodpulp manufactured by treating wood chips with hot chemical solutions which dissolve some of the constituents of the wood and thus separate, and to a considerable degree change the qualities of, the individual wood fibres. Compare **Ground-wood (pulp).** See **Soda-pulp, Sulphate-pulp** and **Sulphite-pulp.**

Clear-cutting. The removal of the entire stand of merchantable timber on a given area in a single operation.

Climate, continental. The type of climate characteristic of the interior of a continent. As compared with a maritime climate, a continental climate has a wide annual and daily range of temperature.

Climate, maritime. A type of climate characteristic of the ocean, oceanic islands, or coastal regions, its most prominent feature being equability of temperature.

Composition. The relative proportions in which various species of trees occur in a forest stand.

Conifer. A term applied to species of trees which bear their seed in cones. Conifers include the pines, the spruces, balsam, hemlock, cedar, and larch, the last-named being the only conifer native to Ontario which is not an evergreen.

Cord. A unit of measurement of stacked wood defined by federal Statute as the amount of wood which can be piled in a space containing 128 cubic feet, but presently used in Ontario to denote several different volumes. See pages 110, 164.

Crown cover. The canopy of leaves and branches formed by the crowns of all the trees in a forest stand.

Cull. To reject a tree, log, or piece of lumber in scaling or grading. Also a term applied to lumber of very low quality but still marketable. Also a tree or log rejected for use because of poor quality.

Culler. See **Scaler.**

Cut. A season's output of logs or the output of lumber from a sawmill in a given period. Hence an annual cut is the quantity of forest products cut on a given area in a year.

Cut-over. Descriptive of forest areas on which felling operations have recently been conducted, and on which there is usually left a quantity of tops, branches and other highly inflammable debris.

Cutting-cycle. The planned interval between major felling operations in the same stand, or the planned period in which all parts of a given forest area are cut over in orderly sequence.

Deciduous. Descriptive of all species of trees which shed all their leaves each autumn as distinct from evergreens which shed and renew their leaves progressively.

Hardwoods or broad-leaved trees are deciduous, but among Ontario conifers larch, or tamarac, is the only deciduous species.

Defect. Any irregularity or imperfection in a tree, log, piece product, or lumber that reduces the volume of sound wood or lowers its durability, strength, or utility value.

Defoliate. To destroy the leaves of a tree as distinct from the normal leaf-fall. Defoliation may be caused by disease or insects, usually the latter. Repeated defoliation for several consecutive years causes the death of the tree, but any defoliation retards growth and weakens the tree.

Diameter-class. One of the arbitrary intervals into which the range of diameter of trees or logs is divided for the purposes of classification and use, e.g., the 10 to 12 inch diameter-class.

Diameter-limit. An established minimum diameter for a given species of tree for the purpose of regulating felling operations. Trees smaller than the diameter-limit may not be felled.

Doe. An adult female deer.

Doyle log-rule. The officially recognized system in Ontario for computing the volumes of sawlogs in terms of "feet board measure". It might be termed a "rule of thumb". For a log 16 ft. long, four inches is deducted from the diameter in inches, as allowance for sawdust, slabs, etc., the remainder is squared and the result tallied as the volume of the log in board feet; e.g., a 16-foot log of 13 inches outside diamater—deduct 4 inches, equals nine inches; nine squared equals 81 board feet. For shorter or longer logs the volume is proportional. In recent years in Ontario, logs under six inches in diameter are being tallied as six-inch logs when measured by Doyle log-rule.

Drive. That part of a logging operation which consists of floating logs or pulpwood down rivers or across lakes to a mill or shipping point. Also the collective term for the body of logs or pulpwood being so floated. Hence, a "drivable" stream is one capable of carrying a drive, and a "joint" drive is a drive in which logs or pulpwood belonging to several owners are driven together, the expense being shared among the owners.

Dues. A term used in Ontario to denote the fixed government charge per unit of volume for any given classification of timber cut on Crown lands before the addition of any "bonus" or "bid".

Durability. The lasting quality of wood, or its permanence in service with particular reference to its ability to resist decay.

Edgings. The strips of wood resulting when the edges of a piece of lumber are sawn straight and square.

Elm (Ulmus). Three species of elm occur in Ontario chiefly in the southern portion of the Province. The wood is heavy, hard and tough, and is in demand for many purposes especially for berry-baskets, cheese-boxes, hockey sticks, barrels and agricultural implements.

End-product. The last product resulting from a chain of manufacturing processes. Thus, pulp is the end product of the pulp mill, paper that of the paper mill and lumber that of the sawmill.

Erosion. As used in this report, the term erosion means the carrying away of soil, by water or wind, resulting

from the removal or destruction of the natural cover of vegetation. Deep gullies, shifting sandy wastes, and the insidious removal of the valuable top soil result from unchecked erosion.

Evergreen. A descriptive term applied to trees whose green leaves remain attached throughout the winter. All Ontario conifers, except larch (or tamarac), are evergreen.

Fire break. See **Fire guard.**

Fire danger (or **hazard**). The resultant of both constant and changing conditions which determine whether a fire will start or spread and, if so, the probable intensity of burning and speed of spread. Some of the factors involved are the moisture content of the humus, the degree of dampness in the air, the wind velocity, etc. Hence, a fire-danger rating system is a method of determining and classifying the degree of fire danger existing at any given time and place.

Fire guard (or **fire break**). A natural or constructed barrier hindering the spread of a forest fire and forming a line from which to work in fighting a fire, and sometimes a route of access to a fire for men and equipment. Fire guards are constructed by removing inflammable vegetation from a fairly wide strip of ground of any desired length. A river is a natural fire guard, a road becomes one, and others may be specially constructed.

Fire protection area. That part of the Province which in the matter of forest-fire detection and suppression activities, is under the control of the Department of Lands and Forests. The approximate boundaries of this area are shown on Map No. 7 in the envelope at the back.

Fire season. The period of the year in which forest fires may normally be expected to occur. This varies somewhat with locality but, generally speaking, in Ontario it extends from mid-April to early November.

Fire tax. An annual government charge on Crown timberlands leased to forest operators to defray, or partially defray, the cost of preventing, detecting, and fighting forest fires. The current rate of fire tax in Ontario is $6.40 per square mile (one cent per acre) per year.

Foot board measure (f.b.m.). A unit of volume used in the measurement of lumber or of logs intended for conversion into lumber or scaled as though so intended. It is equal in volume to a piece of lumber one foot square and one inch thick, or one-twelfth of a cubic foot. When the context makes clear what is meant the word "feet" may be used in place of "feet board measure".

Forest Engineer. A person of professional status trained in the scientific management of forests for the continuous production of wood, or for the maintenance of forests for other beneficial purposes, and also trained in the execution of forest operations. Many forest engineers are specialists in one or another of the many phases of this broad field.

Forest management. The application of business methods **and** technical forestry principles to the exploitation of timberlands.

Forest nursery. An area, with its incidental buildings and equipment, on which young trees are grown and cultivated from specially collected seed for later transplanting in woodlots, plantations, or elsewhere.

Forest policy. The principles and broad plans adopted by a government or the owner of timberland regarding the use, management, exploitation, and protection of the forest. In the case of governments, employment, industrial development, forest taxation, the exportation of forest products, land-use, reforestation, and many other matters enter into any comprehensive forest policy; in short all the many phases of forestry and forest economics which may have a bearing on the welfare of the community.

Fuelwood. This term usually applies to wood cut in the forest or woodlot and intended primarily as a domestic fuel for heating or cooking. It is sometimes applied also to wood refuse accumulated at sawmills which may be used as either domestic or industrial fuel.

Game sanctuary. An area in which hunting is prohibited for the specific purpose of providing a safe breeding ground for game.

Girdling. The removal of a portion of the bark of a tree completely encircling the trunk. The delicate growing tissue, called the cambium, is thus exposed or is removed along with the bark, and in either case the death of the tree follows. Porcupines and beaver often girdle trees while obtaining food and thus do considerable damage in the forest.

Grading. The art or science of classifying lumber, piece by piece, according to established standards of quality, or grades.

Ground rent. An annual rental charged forest operators by the Government for Crown timberlands leased to them. The current and maximum basic rate in Ontario is $5.00 per square mile per year, but in effect the rate varies with circumstances and according to terms of the agreement or license.

Groundwood. A type of woodpulp made by grinding bolts of wood under a stream of water on a revolving stone in such a way that the fibres of the wood are separated but remain chemically unchanged.

Growth ring. The ring visible on a stump or log which indicates the boundaries of one year's growth of the tree.

Habitat. The kind of place in which, or site on which, any specified animals, insects or plants live by preference and where conditions are suitable for their healthy development.

Hardwood. Generally, one of the botanical group of trees which have broad leaves in contrast to the needle-leaf trees, or conifers. Also the wood or lumber produced from such trees.

Hemlock (Tsuga canadensis). A conifer, found growing in that part of Ontario south of the Height of Land and west through the Algoma district, but less abundantly than in the past. Formerly cut in great quantities for the purpose of securing the bark which is used in the tanning of leather. Now used chiefly for construction lumber and crating, but also usable in limited proportions in the manufacture of pulp.

Hewn timber. A form of timber cut in the past (usually of white pine in Ontario) which was hewn out of the log in the forest by hand with the aid of a special (broad) axe. The timbers were usually square in cross-section and as large as the dimensions of the log would permit. Such timbers were called "square timbers".

Hickory (Carya). There are five species of hickory native to Ontario, but their range in the Province is confined to the southwestern counties, and even there they are becoming increasingly scarce. The wood of these species is heavy, hard, and very tough and is in great demand for many purposes particularly for handles for striking tools. Substantial quantities are imported annually from the United States.

High-grading. The practice of cutting a forest stand so that only the best wood, or that most cheaply or easily removed, is taken, the rest being left to deteriorate or die.

Humus. The layer of decaying vegetable and animal matter covering the soil itself which is usually to be found in the forest or woodlot. This may be destroyed by grazing cattle, or by forest fire, or by improper cutting practices. The destruction or removal of the humus is often followed by erosion.

Insecticide. Any chemical used to kill insects.

Inventory. In relation to forests an inventory is a survey to determine the area and condition of the forest stand, its volume and the species which compose it, and all other data required as a basis for sound policies and management and wise cutting programmes and methods.

Jack pine (Pinus Banksiana). See **Pine.**

Jobber. A contractor who carries on forest operations on behalf of the person or company owning or leasing the timberland. The extent of their individual operations may be small and one owner or lessee may employ several jobbers. In the case of Crown lands, the lessee is responsible to the government for the work done by a jobber in his employ.

Kraft. See **Sulphate pulp.**

Land classification. A system of classifying land according to the use to which it may best be put presently or in the future. Thus, in Ontario the major classifications might be farmland, forest land, and mining territory, though in addition there would be other primary classifications and many sub-classifications.

Larch (Larix laricina). Larch, or tamarac, is the only deciduous conifer native to Ontario where it is found in swamps and lowlands of all the forested portions of the Province. The species is of little immediate commercial importance because no stands of it are more than forty of fifty years old. Early in this century all then existing stands were virtually wiped out by an insect epidemic, but the species is now re-establishing itself fairly satisfactorily. The timber is among the hardest and heaviest of the so-called softwoods in Canada, and it is noted for its durability.

Larva (plural larvae). The grub-like, worm-like or maggot-like stage in the life-cycle of certain moths, beetles, and other winged insects. It is during this stage that the greatest amount of feeding is done and hence the most damage.

Leader (shoot). The terminal shoot of the main stem of a tree, or the shoot that takes its place if the genuine leader is killed, at the tip of which all growth in the height of a tree takes place.

Length-class. One of the arbitrary standard lengths, usually of even feet, into which logs are classified for convenience. The interval between classes is usually one foot.

Lichens. A partnership of interdependent plants which grow on rock, bark, etc. One plant in the partnership is a fungus and the other an alga (both low forms of plant life) and each is essential to the life of the other. These plants are an important part of the diet of cariboo.

Life-cycle. The series of stages in the life, form, and way of living through which some plants and animals pass. For example, white pine blister rust cannot complete its life-cycle on the white pine tree, but must pass to gooseberry or currant bushes to complete one phase of it quite different in appearance and way of living from the form assumed on the white pine. Or again, the adult spruce-budworm moth lays eggs which hatch into larvae which in turn pass through five stages of life before entering the pupa, or chrysalis, phase. From the pupae adult moths emerge thus completing the insects' life-cycle.

Lifter. A special piece of equipment for lifting seedlings or transplants from beds in a forest nursery.

Lignin. A compound chemically related to cellulose and with cellulose forming the essential part of wood substance. Lignin forms the adhesive bond which holds the individual wood fibres together, and this substance is removed from the wood in chemical methods of manufacturing woodpulp. The lignin made available as a by-product in the making of pulp can be used in the manufacture of adhesives, plastics and other products.

Limit. A tract of timberland owned by a "limit owner" or leased by a "limit holder" from the Crown for the purpose of conducting a forest industry.

Lodge. The partially submerged dwelling place of a family of beaver, built of sticks and mud.

Log-deck. The platform in a sawmill upon which logs are held in readiness to be sawn.

Log-rule. Any mathematical, graphical, or tabular system by which the contents of a sawlog may be estimated in terms of feet board measure of the lumber which it may yield. There are a great many different log-rules, but a few of them, such as the Doyle log-rule, are grossly inaccurate.

Log-scale. See **Log-rule.**

Lookout tower. A steel or wooden tower surmounted by a cabin or platform, commanding a wide view of the surrounding forest, and from which any forest fires occurring in the region may be observed. The observer is in communication by telephone or radio, or both, with the fire-fighting service and can report the compass bearing and approximate distance of the fire from the tower. Compass bearings on the same fire from two or more towers fix its location accurately. A compass bearing and the approximate distance from one tower will enable an air-borne observer to find, and accurately fix the location of, a fire.

Lumber. To engage in forest operations. Also boards, planks, etc., sawn from logs. "Rough lumber" is lumber which has not been planed or dressed.

M. Thousand. Thus 200,000 M. f.b.m. means two hundred million feet board measure.

Maple (Acer). There are seven species of maple native to Ontario most of them confined to that part of the Province south of the latitude of Timmins and Port Arthur. By far the most important species is sugar

or hard maple (**Acer saccharum**) which, besides being the source of maple syrup and maple sugar, is in great demand for lumber for furniture, flooring, and a great many other products. It is also a prized fuel. "Soft maple" is a name given to either silver maple (**Acer saccharinum**) or red maple (**Acer rubrum**) which are often found growing on wet ground of poor fertility and which have little commercial value except as fuel.

Marginal. Of lands or soils that which produce or can produce a crop which, when sold at existing market prices, will barely return the cost of production. Also of any undertaking the cost of which is as great as, or nearly as great as, the return it brings.

Marks (timber). Marks painted, hammered, or chopped on logs to identify ownership; similar to a trade mark. Hence "timber marking" is the process of marking logs with one's own peculiar brand or mark.

Mattock. An implement for digging or grubbing, not unlike a pick in general appearance, particularly useful in fighting forest fires.

Maturity-age. The age at which a given species or stand of timber becomes ripe for cutting. Before maturity-age the timber is not fully developed either from the physical or economic standpoint, while after reaching maturity-age it is likely to deteriorate or at best does not increase in value. Different kinds of trees or stands have different maturity-ages.

Measuring-worm. A particular genus of caterpillar which has a looping motion when crawling. Several species are serious defoliators of conifers and hardwoods.

Merchantable. A term used to describe logs or lumber of such size and quality as to be acceptable on the open market at current normal prices.

Mixed stands (or **mixedwood stands**). Sometimes this term refers to stands of timber composed of several conifer **or** several hardwood species, but it is more generally applied to stands composed of a mixture of both hardwoods and conifers, and is so used in this report.

Moraine. The deposit of gravel, sand, or boulders left by a melting glacier. Glaciers covered a large part of what is now Ontario during the Ice Age.

Multiple-use operation. A forest operation in which a number of different products, such as pulpwood, sawlogs, poles, veneer-logs, and fuelwood, are extracted simultaneously according to the ability of the stand to yield these products and the capacity of the market to absorb them, each tree cut being converted into that product for which it is best suited. This is a practice very rarely followed at present in Ontario. Compare **Single-purpose operation.**

Natural forest. A forest **not** grown from seeds or seedlings planted by man.

Natural reproduction. Seedlings or young trees grown from seeds from neighbouring trees. That is to say, natural reproduction is the way in which a natural forest perpetuates itself. Compare **Plantation.**

Newsprint. The type of paper on which newspapers are usually printed. It consists of roughly four or five parts of groundwood pulp to one part of sulphite pulp. In volume and total value (but not in unit value) newsprint is by far the most important product of the paper industry of Ontario. The manufacture of other

types of paper gives more employment and brings higher returns per ton of output.

Oak (**Quercus**). There are about eight species of oak native to Ontario and all grow most commonly, but not too abundantly, in Old Ontario. Scattered red oak (**Quercus borealis**) and bur oak (**Quercus macrocarpa**) are to be found as far north as the Height of Land; while white oak (**Quercus alba**) grows sparsely in the Algonquin Muskoka regions. Oak is strong, hard, tough and durable and is one of the most valuable of Ontario trees. It is in great demand for furniture (chiefly white oak), flooring, vehicle and farm implement construction, interior trim, and a host of other purposes. The supply of good oak is dwindling in Ontario and much is imported from the United States every year.

Operation. The whole sequence of activities involved in getting timber to the mill or loading point, including felling, bucking, skidding, hauling, and driving as well as the preliminary activities such as the construction of roads, camps, dams, or other structures necessary to facilitate the extraction of timber.

Operating plan. A plan setting out the details of an imminent operation, as distinct from a **working plan** which deals with the long-term exploitation of a forest area. An operating plan includes information on the volume of timber to be cut, the type of product to be taken, the area on which the operation will be conducted, the number of men to be employed, improvements and facilities to be constructed and other pertinent data of like nature.

Outfitter. One who makes a business of supplying hunters, anglers and tourists with the equipment necessary in their chosen form of recreation and who often organizes and conducts fishing and hunting parties.

Overcut. To cut a greater volume of timber on a given area than is replaced by new growth on the entire limit of which the cut-over area is part, or to cut a quantity of timber on an area in excess of what is indicated as proper according to good forestry practice.

Over-length tolerance. The same as **Allowance for trim** in the case of sawlogs, but in Ontario, in the case of unbarked pulpwood, an over-length tolerance of two inches in four feet is allowed to compensate for the smaller amount of wood in a cord of unbarked wood than in a cord of peeled wood. The stumpage rate per "cord" is the same in both cases, however.

Over-mature. Descriptive of a tree or stand which has passed beyond its prime and is deteriorating. Over-mature stands are apt to be unhealthy and susceptible to attack by insects or disease and are thus a menace to nearby younger stands. Over-mature stands should be cut to make room for young vigorous ones, otherwise an economic loss is sustained.

Overrun. The amount by which actual production exceeds the estimated production. With reference to log-rules it means the excess of the quantity of lumber produced from a given lot of logs over the total arrived at by scaling the logs according to any given log-rule. Thus, to say the Doyle rule gives a large overrun on small logs means that the actual production of lumber from small logs is much greater than the application of the Doyle rule to their measurement indicates.

Overscale. Descriptive of a log-rule which **overestimates** the quantity of lumber a given log, or group of logs, will yield. That is to say, the opposite of what the Doyle rule does.

Parasite. A plant (generally a fungus) or animal (generally an insect) which lives in or on another plant or animal from which it draws its nourishment but gives nothing in return. Thus white pine blister-rust and rot-causing fungi are parasites of the trees in which they live, while lice are parasites of the animals they infest. In entomological work, in particular, man makes use of parasites on a large scale to help destroy insect pests.

Pier. In forest operations a pier is a timber cribwork built in the water or along the bank of a stream and filled with rock to keep it in place. A pier may serve as a mooring to which booms may be fastened, or may be used along a river to guide logs through stretches of rough water between rocky banks where the timber might otherwise become jammed.

Pitch. A gummy substance occurring in the wood of certain trees, generally conifers, of which the pines are good examples. An excessive proportion of pitch in a wood renders it unfit for making some types of wood-pulp. Pine and other pitchy woods can satisfactorily be used in making sulphate pulp.

Pile bottom. Round timbers specially cut and placed on the ground to form a firm and reasonably level foundation on which to pile logs or bolts in the woods.

Piling. Round timbers in long lengths similar to telephone or telegraph poles, but used to drive into the soil to provide a secure foundation for structures built on soft, wet, or submerged ground.

Pine (Pinus). Four species of pine are native to Ontario of which three are of great commercial importance and one of virtually none. White pine (**Pinus strobus**) is the species on which the great lumbering industry of Ontario was founded, but the fine virgin stands of it are now practically all gone and cannot be restored in their former greatness for generations. Second-growth white pine will continue to be an important, but perhaps not dominant, wood in our lumber industry. White pine grows in all parts of the Province south of the Height of Land, but reaches its best development in the Ottawa Valley, the Georgian Bay region, and, to a lesser extent, in the Rainy River area. Good-quality white pine lumber is one of the most highly prized softwoods in the world. Its uses as lumber are legion, but it is not used for pulp partly because it is suitable only for the sulphate process but more particularly because its value is greater for other purposes. Red pine (**Pinus resinosa**) is another important species for making lumber although the best stands of it, too, have all but gone. Red pine grows over practically the same range as does white pine, and the two species often grow side by side in the forest, though red pine tends to grow in pure stands more than does white pine. There is always a good demand for red pine lumber for construction work and general carpentry purposes, and this species also makes excellent poles and piling. Jack pine or Banksian pine (**Pinus banksiana**) is the most widespread of Ontario pines being found in practically all forested areas of the Province north of the Muskoka region. It makes a fine general-purpose lumber and is sought after for poles, piling and ties.

It is excellent for use in the manufacture of sulphate pulp and can also be used in limited proportions in other kinds of woodpulp. In short, although this species was neglected in the past, its all-round usefulness and its ubiquity will make it an increasingly important timber as white pine and red pine diminish in significance, which they are bound to do for a time at least.

Plantation. An artificially created forest established by planting seedlings or, more rarely, by sowing seed. Plantations are relatively expensive to establish and are usually resorted to only when natural methods of establishing a forest fail or cannot be used.

Plywood. Panels constructed of an odd number of thin layers of wood (veneer) glued together in such a way that the grain of the wood in adjacent plies is at right angles. It is widely used in house construction, furniture manufacture, and for a great many other purposes. In Ontario, yellow birch is the wood most commonly used for making plywood, but it is probable that other species will be used for this purpose in increasing quantities. Poplar, maple, white birch, red pine, white pine, oak, and several other species lend themselves to this use. See **Veneer-log.**

Pole. Round timber in long lengths usually used to support power lines or telephone or telegraph wires. In Ontario, red pine and jack pine are used extensively, though cedar is a favorite wood when it can be secured in suitable quality but cedar of the desired type is becoming scarce. Poles must meet quite rigid standards of size and quality and are almost invariably given a chemical treatment to render them more resistant to decay. See **Treating.**

Poplar (Populus). There are four species of poplar native to Ontario. Two of them—aspen (**Populus tremuloides**) and balsam poplar (**Populus tacamahacca**)—occur in all the forested parts of the Province while the others—large-toothed aspen (**Populus grandidentata**) and the sparser cottonwood (**Populus deltoides**)—do not occur north of the Height of Land. The poplars are rather neglected species which should, and probably will, command more attention in the future. Poplar is used extensively in the manufacture of soda pulp, and is used to a lesser extent in making other types of woodpulp though its possibilities in this direction are not yet fully exploited. Selected poplar is in strong demand for making matches. The species will also yield good general-purpose lumber, crating material, excelsior, and many other products. Poplar is very prolific in Ontario.

Portable mill. This term refers to sawmills of a type which can be moved from place to place with relatively little trouble or expense. At present they tend to produce rather poorly manufactured lumber, but this could be overcome by improvements in design and maintenance and by the instruction of their operators. Their worst feature is that, under existing conditions, they are notoriously wasteful of raw material.

Power pump. A gasoline-driven pump. Several types are especially designed for use in fighting forest fires and usually these are so light and easily handled that they can be carried by one or, at most, two men. They are invaluable weapons to the fire fighter.

Precipitation. Chiefly rain and snow but, strictly speaking, moisture in any form deposited from the atmosphere, such as dew, hail or hoarfrost.

Predator. An animal which preys upon and devours other animals. Thus birds, certain small mammals, frogs and toads, and even fish, are predators of insects.

Pulp. See **Woodpulp** and **Pulpwood.**

Pulpwood. Round wood cut for the specific purpose of being made into woodpulp. It is usually cut in lengths of approximately four feet or eight feet in the woods, but occasionally it is transported in longer lengths and cut up at the mills. Pieces of pulpwood do not need to be of large diamter, in fact it is usually better that they be fairly small, but unfortunately large trees more suitable for sawlogs or poles are often cut for pulpwood. Spruce is by far the most popular species for making woodpulp, but balsam, jack pine, poplar birch, hemlock, and other species can, and should, be used more than they are. Pulpwood is often, though incorrectly, referred to as pulp.

Ranger. A junior-grade employee of the Department of Lands and Forests whose duties are chiefly in the field and relate to fire prevention, fire suppression, fish and game protection, maintenance of telephone lines, inspection work, and sometimes scaling. A Chief Ranger is the senior representative of the Department in his area, or "Ranger Division". He is responsible directly to the District Forester and is in charge of all Rangers in his area.

Rate of growth (per acre). The speed at which the volume of wood in a stand of timber increases as the trees grow, usually stated in terms of cubic feet per acre per year. It is influenced by the species, the site, the climate, the soil, the cutting methods practised, and other factors.

Rear. See **Sweep.**

Red-heart. A type of rot, often not of a very detrimental nature in its early stages, which causes the heartwood, or central core of a tree, to turn reddish brown in color. All such rots are caused by fungus growth.

Red pine. See **Pine.**

Reforestation. The artificial restocking of an area with forest trees, usually with transplants but occasionally by the sowing of seed.

Refuse burner. An incinerator, often of very crude and unsafe design, used at sawmills for the purpose of disposing of by-products for which no other outlet has been found.

Regeneration. The process by which a forest, woodlot, or stand is renewed after being cut, burned, blown down, or otherwise killed. It may be brought about by either natural or artificial means.

Reproduction. See **Regeneration.**

Residual stand. The stand remaining after a cutting.

Re-stocking. The replacing of artificially reared fish in lakes or streams in which the fish population is depleted by reason of too much angling or from other causes.

Rollway or Skidway. An orderly pile of logs usually built near a road so that the logs may conveniently be loaded on trucks or sleighs, or near a river or lake in which they may be placed when the drive begins. See illustrations on pages 165 and top of 166.

Rotation. The cycle represented by the growth of a new tree to a predetermined state of maturity usually,

but not necessarily, in place of a like one cut down. The length of this cycle depends, among other things, upon the species of tree involved, the characteristics of the soil and site, and the silvicultural methods used in exploiting the stand.

Salvage operation. An operation conducted for the purpose of extracting timber dying or killed as the result of damage by fire, insects, disease, storm, or floods, or threatened with death from these or other similar causes.

Sand-drifting. See **Soil-drift.**

Sawlog. A log of suitable size and quality to be sawn into lumber.

Scaler. One who measures wood cut in the forest and computes the volumes of cut wood. In Ontario only those licensed to do so may scale wood from Crown lands, and licenses are issued only after the applicant has passed an examination to test his knowledge and skill. Culler is an older, but now little-used, name for this occupation.

Second-growth. The forest which develops after the removal of the virgin timber by cutting, fire, or any other cause.

Seed collection. The process of gathering seeds from trees to supply to forest nurseries or to sow in areas selected for reforestation. In the case of conifers the cones, which contain the seeds, are collected before they open.

Seeder. A mechanical device used for sowing seed in a forest nursery.

Seed extraction plant. An establishment for preparing tree seed for sowing. The processes include drying the cones (in the case of conifer seed) to open them, extracting the seed, cleaning the seed, testing the germinating power of the seed, and storing the seed under proper conditions.

Seedling. A very young tree in the forest or woodlot or, in nursery practice, one not yet set out in a transplant bed.

Seed tree. A tree left standing after an operation for the specific purpose of supplying the seed necessary for the renewal of the stand.

Seigneurie. Land granted to a Seigneur (a French aristocrat) by the French Crown in the early days of the colonization of Canada.

Shingle. A thin, flat slab of wood tapering lengthwise in thickness used in covering roofs or walls. Cedar is the wood most in demand for this purpose.

Shingle-bolt. See **Bolt.**

Shook. See **Box shook.**

Silt. Fine particles of soils carried by the water in streams and rivers as the result of erosion. Where the current slackens or dies these particles fall to the bed of the stream or lake and form a layer of mud. Silt also discolors the water and prevents sunlight from penetrating the water to the detriment of fish and the aquatic plants and animals on which they feed.

Silviculture. The producing and tending of a forest scientifically.

Single-purpose operation. A forest operation in which only one type of product, for example, pulpwood **or** sawlogs **or** poles, etc., is removed. Compare **Multiple-use operation.**

Sinkage. The loss of wood sustained by reason of logs or bolts absorbing so much water during the drive that they sink before they reach the mill or loading point.

Skidway. See **Rollway.**

Slab. The piece of wood removed by the first saw-cut taken from the outside of a sawlog. This piece of wood, then, has one flat, sawn surface and one rounded one (usually with the bark still on it) and is tapered in thickness.

Slash. Debris consisting of tops, branches, broken wood and trees left on the ground after a logging operation. Also, as applied to land, the term indicates an area from which all merchantable timber has been stripped.

Slide. A flat-bottomed chute built of timbers down which water is flushed so that logs can be safely floated or slid instead of being driven through bad rapids or over falls which might result in much breakage or cause jams.

Soda pulp. A type of chemical woodpulp in which wood chips are cooked in a solution of caustic soda. Hardwoods are used extensively for this kind of pulp and the resulting product is used largely for book-paper and writing paper.

Soft maple. See **Maple.**

Soil drift. A type of erosion of light sandy soils brought about by the action of the wind whereby soil-drifts, comparable to snow-drifts, are formed.

Soil type. A classification of soil based on its composition (as determined by chemical and physical analysis) and/or by its capacity to sustain agricultural or forest crops.

Spawning bed. A spot in a lake or stream selected by fish as a suitable place in which to deposit their eggs. Depth of water, type of bottom, temperature of water, character of underwater vegetation, and other considerations influence the choice of site.

Spruce (Picea). Three species of spruce are native to Ontario, but only two of them—white spruce (**Picea glauca**) and black spruce (**Picea mariana**)—are of substantial importance. These two species are found throughout all parts of the Province where trees of any kind grow. Spruce is an important species to the lumber industry and vital to the pulp and paper industry. The chart on page 39, however, indicates that spruce is being over-cut and its use should be brought into balance by using other species whenever they can be satisfactorily substituted.

Square timber. See **Hewn timber.**

Squatter. One who settles on land which does not belong to him. By law a squatter acquires title to Crown land he may occupy under certain conditions including undisturbed occupancy for a specified number of years.

Stand. An aggregation of trees of uniform composition as to species, age-classes present and condition, occupying an area of any size but distinctly different from the forest in adjoining areas.

Stave. One of the upright pieces of wood in the side of a barrel, tub, pail, etc.

Stave bolt. See **Bolt.**

Stemwood. The wood of the main trunk of a tree as distinct from the branches and roots. Often called "bodywood" in Canada.

Strip-roads. Strips cleared at more or less regular and frequent intervals throughout a pulpwood operation at the sides of which the cutters pile the pulpwood taken from the adjoining area, and over which the wood is hauled out by sleigh in winter. These are discernible as the pale irregularly curved lines in the aerial view illustrated in the plate on page 24.

Stumpage. The amount charged by an owner for standing timber usually in terms of the units of measurement of the wood after it is cut. In the case of wood cut on Crown lands the term means the sum of the dues, bonus and other levies charged for the wood when it is cut.

Sugar bush. A stand of sugar maple trees cultivated or managed primarily for the production of maple syrup.

Sulphate pulp. This type of pulp, also known as kraft, is made by cooking wood chips in a mixture of caustic soda and sodium sulphide. The resulting pulp is tough and is used for good-quality wrapping paper and other purposes where strength is an essential quality. Pine can be and is used extensively in the manufacture of sulphate pulp.

Sulphite liquor. The liquid resulting from the manufacture of sulphite pulp which contains, besides the original chemical ingredients, the lignin extracted from the wood. This sulphite liquor is usually discarded though it can be, and sometimes is, used as a raw material in the manufacture of many valuable products.

Sulphite pulp. A type of woodpulp made by cooking chips in a solution of calcium bisulphide. The resulting pulp is used, unbleached in the production of newsprint; after being bleached, in the production of tissue, book and other papers and, in a more refined form, it is the basic raw material in the manufacture of rayon, cellophane and other products. Spruce is the principal wood used but other species can be used to varying but limited extent.

Sunscald. Injury (often fatal) to the sensitive growing tissue under the bark of a tree caused by direct rays of the sun. Forest-grown trees are not accustomed to complete exposure to sunlight, and if a few trees are left so exposed after an operation they are likely to die of sunscald.

Sustained-yield. The crop of timber which can be removed from a given area periodically without impairing the ability of the area to yield the same quantity of wood in an equal period in perpetuity.

Sweep. The process of re-floating stranded logs after a drive has passed down a river. Where several operators separately drive a river there may be a sweep after each operator's drive to avoid the mixing of logs of different ownership. Also the curvature in a log.

Tamarac. See **Larch.**

Tanbark. The bark of certain trees used in making the solution in which leather is tanned. The bark of hemlock and certain oaks were used very extensively for this purpose. In the case of hemlock the wood was usually discarded after the bark was stripped off.

Thrifty. Descriptive of a tree or a stand which is in good condition and growing at a satisfactory rate.

Tie. Timber sawn or hewn into pieces to support rails for railway tracks. Selected hardwoods or softwoods are used and the majority are now given a chemical treatment with a preservative to prolong their usefulness.

Timber-line. The demarkation between wooded and non-wooded areas. The economic timber line refers to the northern limit of growth of timber of commercial size in substantial quantity.

Timber-mining. An expression used to describe a ruthless felling of timber conducted without thought of the renewal of the forest. Hence, a timber-miner is one who conducts such an operation.

Top. The upper portion of a tree trunk with the branches attached which is not economically usable, or at least which is not used and is left in the woods.

Tower. See **Lookout tower.**

Towerman. The observer stationed at a lookout tower.

Transplanter. A mechanical device used in transplanting tree seedlings from seed beds to transplant beds.

Treating. Timber may be chemically treated to increase its durability when it is subjected to conditions favoring decay or, more rarely, to render it resistent to fire, or for other reasons. Such processing is done at treating plants.

Tree planter. A mechanical device used to assist in the planting of trees.

Trimming. The discarded pieces of wood resulting from cross-cutting a board or a plank exactly to the specified length and square across both ends.

Under-cutting. The cutting of a smaller quantity of wood within an area than the equivalent volume added by new growth on the area during the period between operations.

Undersize. Descriptive of trees of smaller diameter than the minimum at which they should be cut.

Veneer log. A log of special size and quality, and of a desirable species, cut for use in making veneer. Veneer is the name given to thin sheets of wood. It is usually produced on a special lathe and the sheet of veneer is cut from the log in a manner resembling the unwinding of a roll of paper. Sometimes veneer is sliced from the log as bacon might be sliced. Veneers are used for making berry-baskets and fruit-baskets, but more particularly in the growing plywood industry. Yellow birch and elm are the species most used for this purpose in Ontario, though other species are used to a lesser extent.

Virgin stand (or forest). A stand or forest the development and growth of which has not been influenced by human activity.

Walkie talkie. A portable radio-telephone which can be used to transmit and receive messages even while the person carrying it is in motion.

Waste liquor. See **Sulphite liquor.**

Water table. The upper limit of the level at which the soil is completely saturated with water. The water table moves up and down according to the amount of precipitation in the area and the natural or artificial drainage.

White ash. See **Ash.**

White birch. See **Birch.**

White oak. See **Oak.**

White pine. See **Pine.**

White spruce. See **Spruce.**

Whitewood. A common name for poplar in some parts of Ontario.

Wind-break. A belt of trees left standing, or planted, for the purpose of giving shelter from the wind. A wind-break may be used to shield a house, a garden, an orchard, a road or railway, or farmland.

Wind-firm. Descriptive of those species of trees which have root-systems which go deep in the soil and thus make the trees resistent to high winds.

Willows (Salix). None of the willows which grow to tree size in Ontario are of any special commercial importance. The kinds referred to in this report are shrub-like and may for the most part be considered as worthless weeds, their only useful function being that they provide ground cover. They often grow on land of low quality.

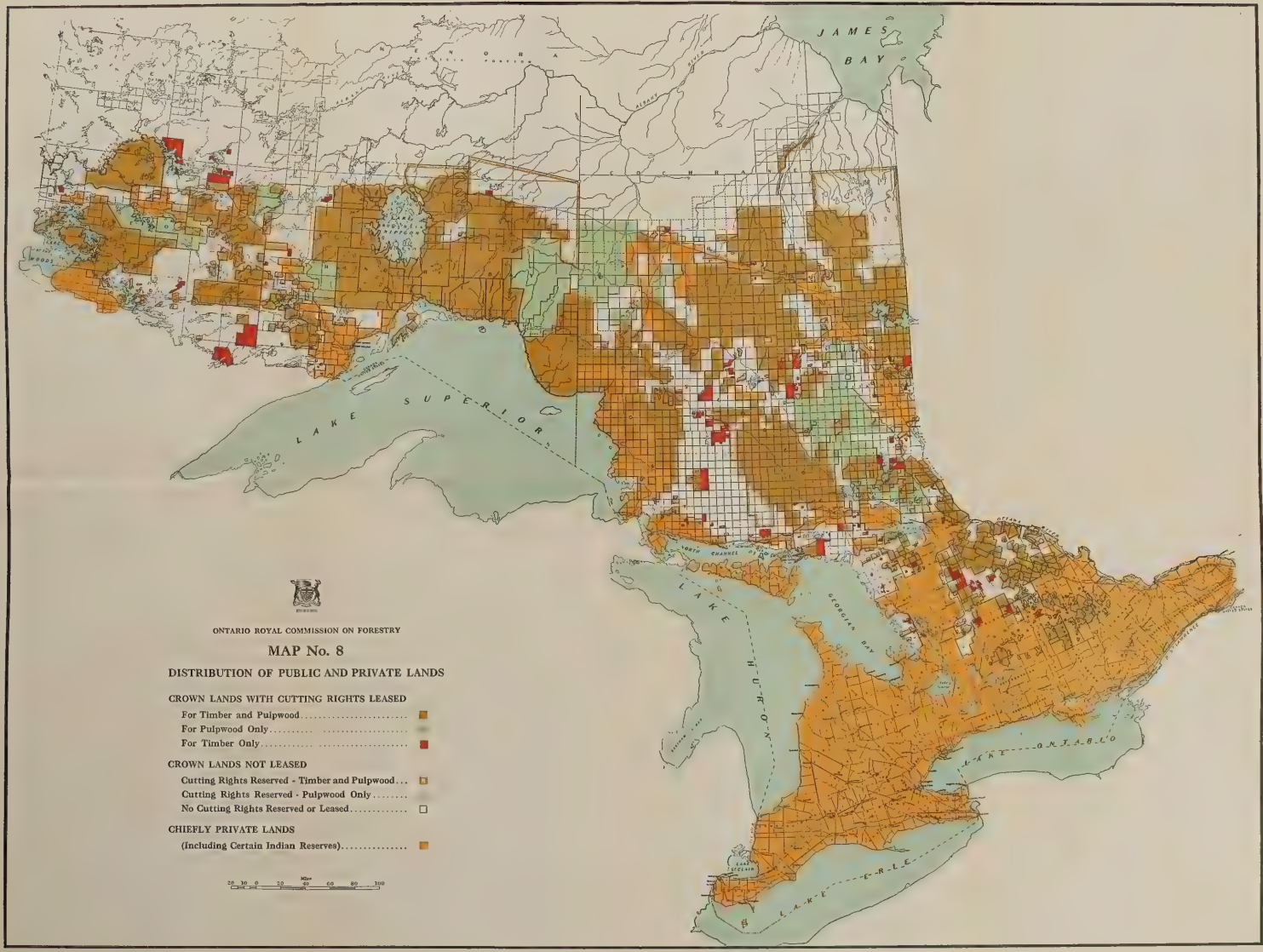
Woodlot. A relatively small wooded area most often associated with farms. Woodlots act as a source of fuel, posts, etc., for the farm and as a source of cash income from the sale of logs and pulpwood. In the aggregate their importance to the community is very great, quite apart from their commercial value, in that they help conserve soil moisture, provide a habitat for game and birds, retard water-run-off (and so help prevent floods) and reduce erosion by wind and water.

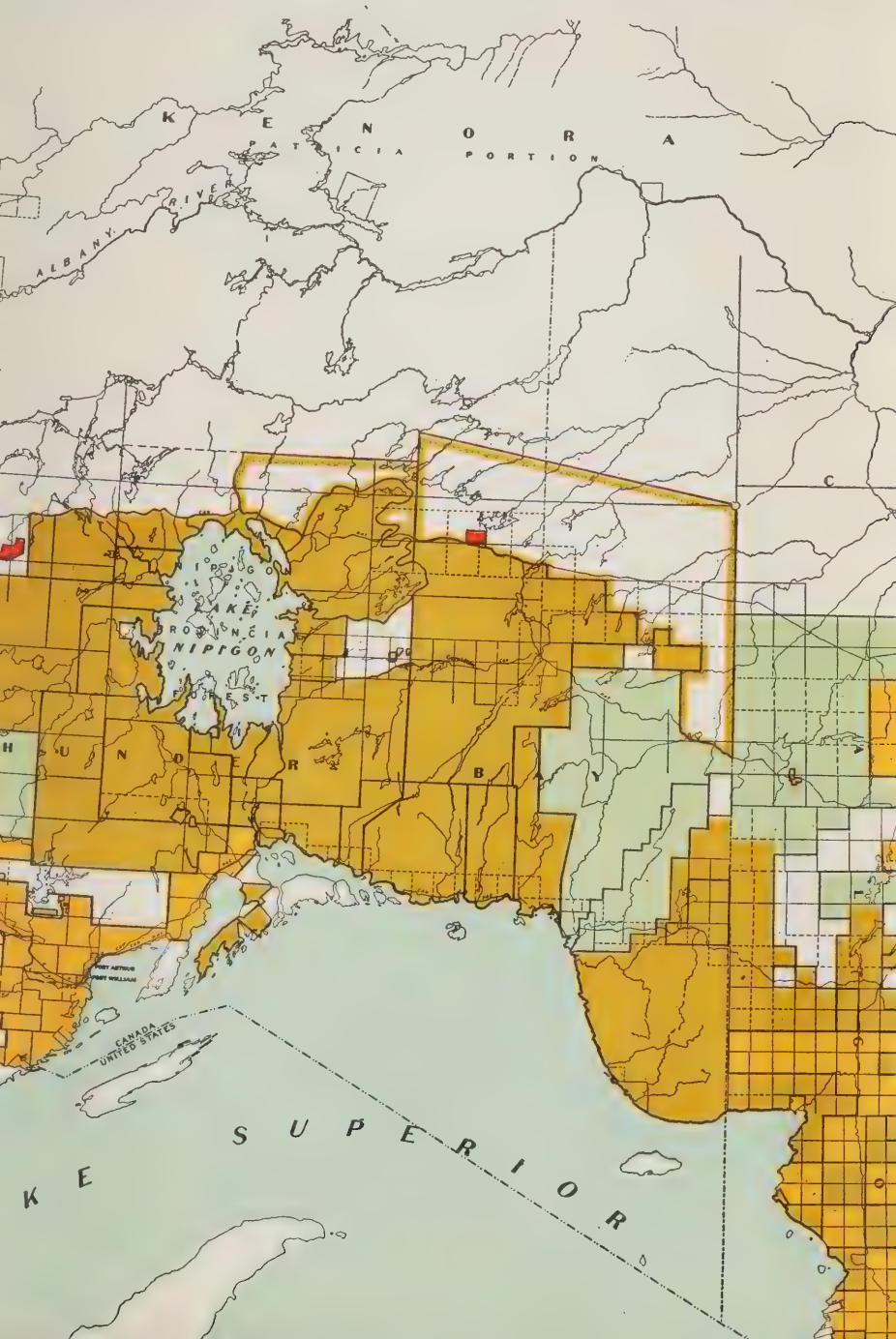
Woodpulp. Wood fibres separated by mechanical or chemical means and used for manufacturing papers, textiles, and many other products based on the use of cellulose.

Working plan. A long-term plan for the scientific and businesslike management of a forest area with the aim of getting the greatest annual crop of wood economically feasible in perpetuity.

Yarding area. A wintering ground selected by some wild animals, such as deer and moose, for reasons of food supplies and in which during deep snow the animals can move relatively freely along well trampled paths to feeding areas.

Yellow birch. See **Birch.**


JAMES BAY
LAKE SUPERIOR
LAKE HURON
GEORGIAN BAY
LAKE ONTARIO
LAKE ERIE
ONTARIO ROYAL COMMISSION ON FORESTRY
MAP No. 8
DISTRIBUTION OF PUBLIC AND PRIVATE LANDS
CROWN LANDS WITH CUTTING RIGHTS LEASED
For Timber and Pulpwood
For Pulpwood Only
For Timber Only
CROWN LANDS NOT LEASED
Cutting Rights Reserved - Timber and Pulpwood
Cutting Rights Reserved - Pulpwood Only
No Cutting Rights Reserved or Leased
CHIEFLY PRIVATE LANDS
(Including Certain Indian Reserves)
50 30 0 20 40 60 80 100
Miles


K E N O R A
PATRICIA PORTION
ALBANY
RIVER
NIPIGON
LAKE
PROVINCIA
NIPIGON
FOREST
H U N D E R
B A Y
PORT ARTHUR
FORT WILLIAM
CANADA
UNITED STATES
S U P E R I O R
K E

ONTARIO ROYAL COMMISSION ON FORESTRY

MAP No. 7

LOCATIONS OF INSPECTIONS MADE BY THE COMMISSION IN 1946

- Inspections .....
- Field Bases (Mobile Office) .....
- Approximate Limit of Commercial Timber ...
- Limits of Protection Area .....
- Northern Reconnaissance Flights .....

ONTARIO

ONTARIO ROYAL COMMISSION ON F

MAP No. 7

[LOCATIONS OF INSPECTIONS M
COMMISSION IN 194

Inspections .....

Field Bases (Mobile Office) .....

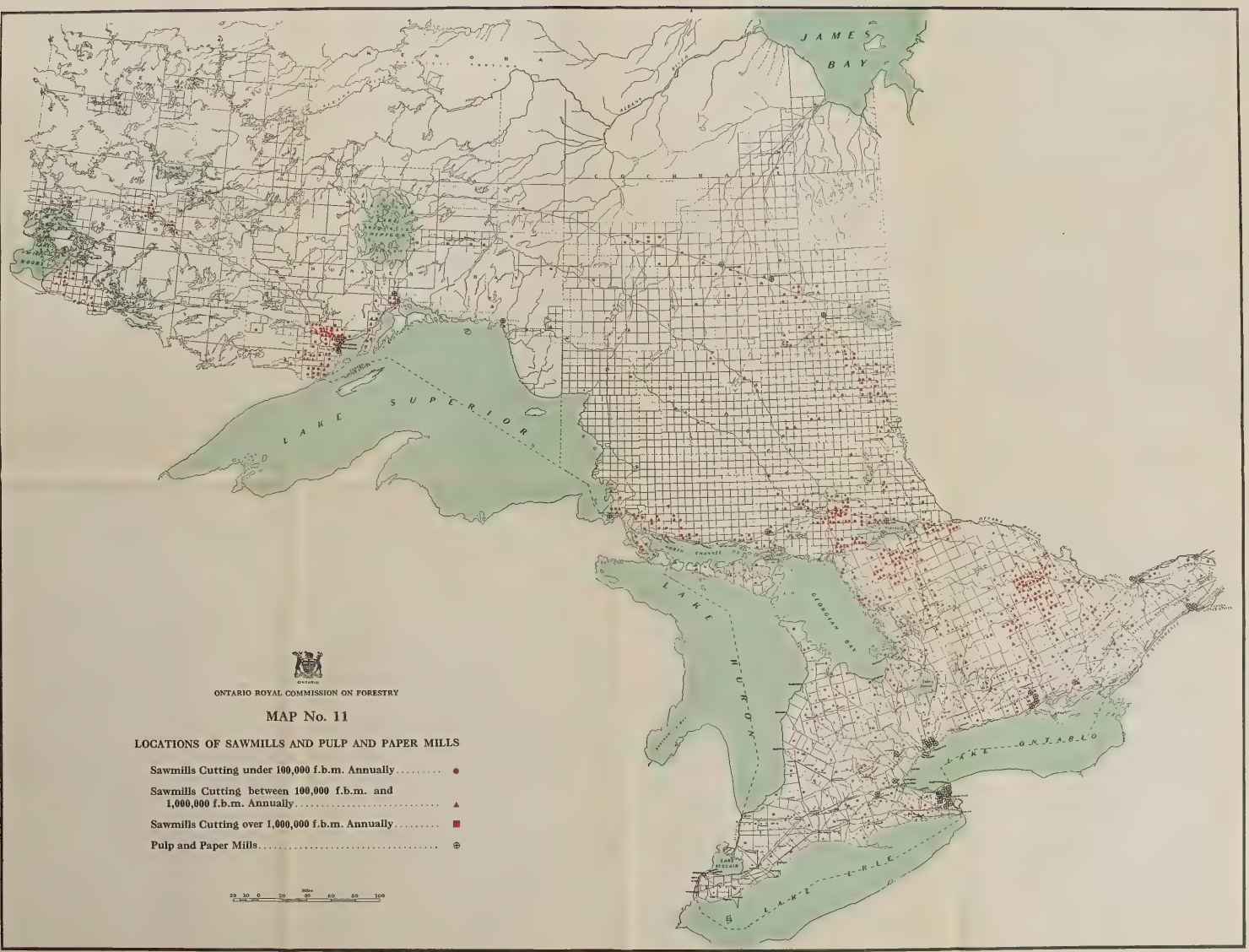
Approximate Limit of Commercial T

Limits of Protection Area.....

Northern Reconnaissance Flights...

45°

95°


JAMES BAY
LAKE SUPERIOR
LAKE HURON
GEORGIAN BAY
LAKE ONTARIO
LAKE ERIE
ONTARIO
ONTARIO ROYAL COMMISSION ON FORESTRY
MAP No. 11
LOCATIONS OF SAWMILLS AND PULP AND PAPER MILLS
Sawmills Cutting under 100,000 f.b.m. Annually
Sawmills Cutting between 100,000 f.b.m. and 1,000,000 f.b.m. Annually
Sawmills Cutting over 1,000,000 f.b.m. Annually
Pulp and Paper Mills
20 30 0 20 40 60 80 100
Miles

TARIO

MISSION ON FORESTRY

No. 11

D PULP AND PAPER MILLS

0 f.b.m. Annually.....

0,000 f.b.m. and
.....

0 f.b.m. Annually.....

.....

Miles
40 60 80 100

ONTARIO ROYAL COMMISSION ON FORESTRY

MAP No. 10

COUNTY AND MUNICIPAL FORESTS

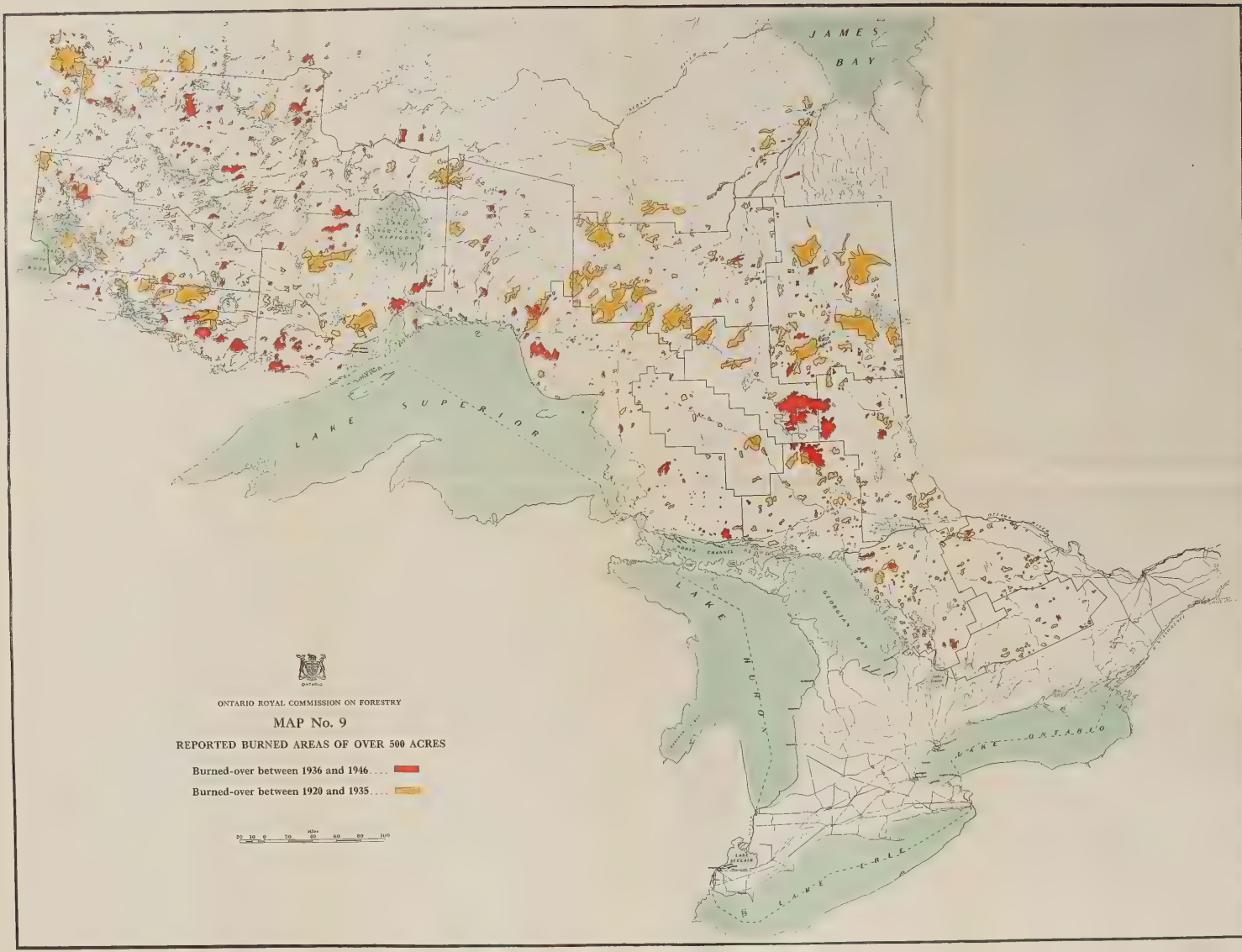
Land under Municipal Reforestation Act

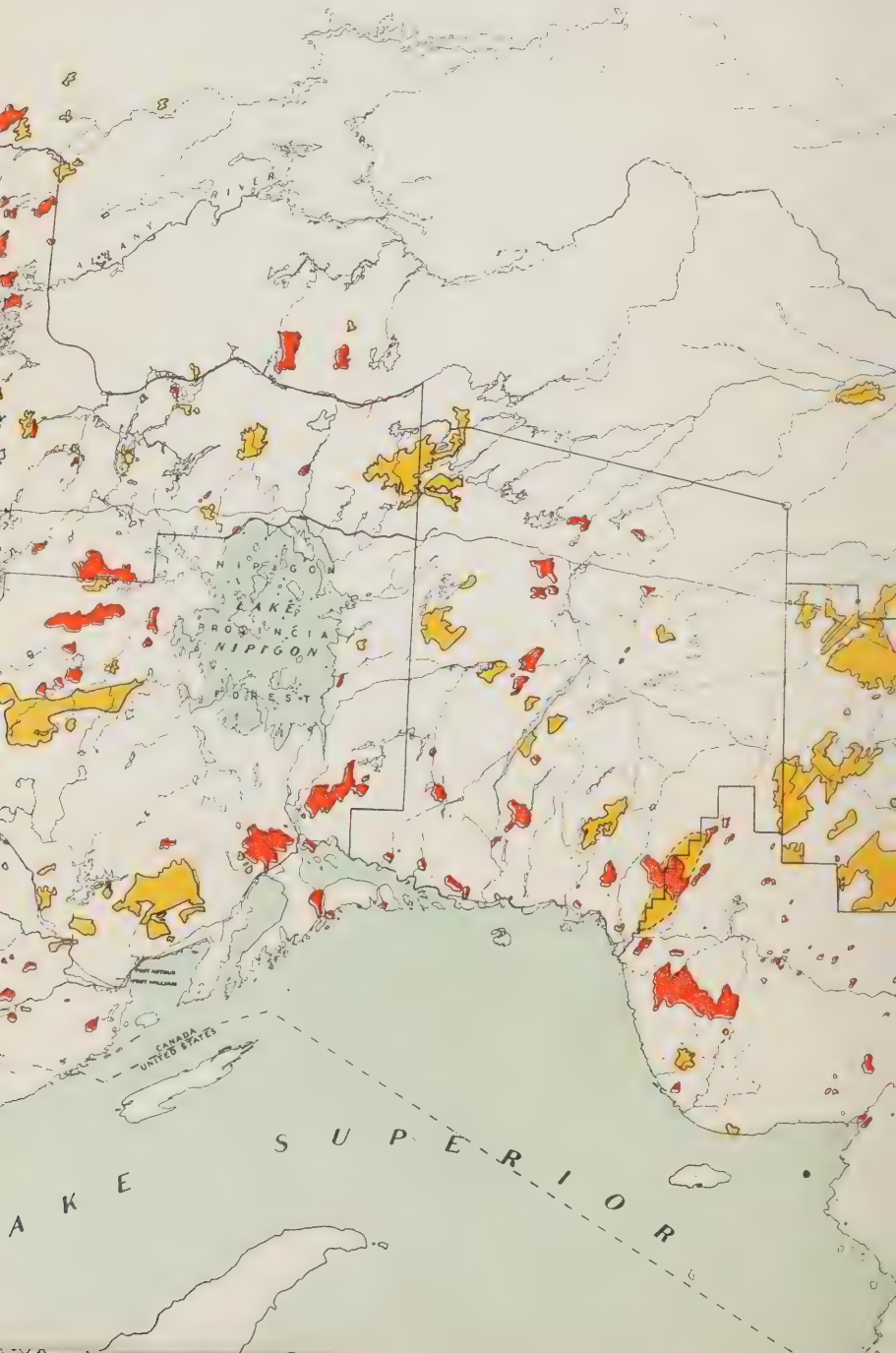
Land not under Municipal Reforestation Act

COUNTY	Acreage under the Act	Acreage not under the Act
Brant	....	59*
Bruce	5,245	90*
Carleton	....	700
Dufferin	1,440	235
Dundas	....	124
Durham	1,375	....
Elgin	175	90*
Essex	....	....
Frontenac	....	....
Glengarry	....	200
Grenville	1,550	4*
Grey	1,891	223
Haldimand	....	....
Halton	....	607
Hastings	....	177
Huron	....	463
Kent	....	20*
Lambton	....	700
Lanark	1,600	....
Leeds	....	5*
Lennox and Addington	....	12*
Lincoln	....	....
Middlesex	....	240
Norfolk	....	1,723
Northumberland	1,550	....
Ontario	1,075	50*
Oxford	....	590
Peel	....	65*
Perth	....	75*
Peterborough	....	3,000
Prescott	....	219
Prince Edward	....	....
Renfrew	....	....
Russell	11,000	....
Simcoe	9,375	410
Stormont	....	70*
Victoria	3,600	....
Waterloo	....	545
Welland	....	....
Wellington	....	1,759
Wentworth	....	436
York	2,622	65*
	42,498	12,974

*Areas less than 100 acres not plotted


RENFREW
TORIA
PETERBOROUGH
HASTINGS
LENNOX AND ADDINGTON
FRO


JAMES
BAY
LAKE
SUPERIOR
LAKE
HURON
GEORGIAN BAY
LAKE
ONTARIO
LAKE
ERIE
ONTARIO
ONTARIO ROYAL COMMISSION ON FORESTRY
MAP No. 9
REPORTED BURNED AREAS OF OVER 500 ACRES
Burned-over between 1936 and 1946....
Burned-over between 1920 and 1935....
Miles
20 10 0 20 40 60 80 100


ALBANY RIVER
NIPIGON
LAKE
PROVINCIAL
NIPIGON
FOREST
CANADA
UNITED STATES
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